

DRAFT
2007 AQMP APPENDIX IV-A

DISTRICT'S
STATIONARY AND MOBILE SOURCE CONTROL
MEASURES

OCTOBER 2006

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SECTION 1

STATIONARY SOURCE CONTROL MEASURES

INTRODUCTION

This Appendix describes the South Coast Air Quality Management District (District) staff's proposed stationary and mobile source control measures to be included in the 2007 AQMP. Control measures presented in this appendix for PM_{2.5} are based upon a variety of market incentives and control strategies that are commercially available and technologically feasible in the next several years. This appendix also includes three mobile source measures that the District is proposing to implement. Since CARB will not release its State and federal strategy for the California SIP until January 2007, District staff recommended measures for CARB consideration are included in Appendix IV-B.

STATIONARY SOURCE CONTROL MEASURES

The draft 2007 AQMP includes 32 short-term control measures for stationary and mobile sources developed by the District that are expected to be implemented within the next several years. Five long-term measures for stationary and mobile sources are also included in this draft plan. Stationary source measures contained in the 2007 AQMP include the remaining revised and partially implemented measures from the 2003 AQMP with 24 additional new control measures.

It should be noted that the emission reduction targets for the proposed control measures (those with quantified reductions) are established based on available or anticipated control methods or technologies. However, emission reductions associated with implementation of these and other control measures or rules in excess of the AQMP's projected reductions can be credited toward the overall emission reduction targets for the proposed control measures in this appendix.

Each of the Control Measures falls into one of seven strategies. These strategies and the corresponding Control Measure are presented in the following table:

TABLE 1
List of District's Control Measures Categorized by Control Strategy

Facility Modernization	
Number	Title
MCS-01	Facility Modernization [All Pollutants]
Energy Efficiency/Conservation	
Number	Title
MCS-02	Urban Heat Island [All Pollutants]
MCS-03	Energy Efficiency and Conservation [All Pollutants]

TABLE 1
(Continued)

Good Management Practices	
Number	Title
FUG-01	Improved Leak Detection and Repair [VOC]
FUG-02	Emission Reductions from Gasoline Transfer and Dispensing Facilities [VOC]
FUG-04	Emission Reductions from Pipeline and Storage Tank Degassing [VOC]
BCM-01	PM Control Devices (Bag Leak Detectors/Wet Scrubbers/Electrostatic Precipitators, Other Devices) [PM]
MCS-04	Emissions Reduction from Green Waste Composting [VOC, PM and NH ₃]
MCS-06	Improved Start-up, Shut-down & Turnaround Procedures [All Pollutants]
Market Incentives/Compliance Flexibility	
Number	Title
CTS-02	Clean Coating Certification Program [VOC]
CMB-02	Reduction of Emissions in RECLAIM (BARCT) [SO _x]
FLX-01	Economic Incentive Programs [All Pollutants]
FLX-02	Petroleum Refinery Pilot Program [VOC and NO _x]
Area Source Programs	
CTS-01	Industrial Lubricants [VOC]
CTS-03	Consumer Product Labeling and Emission Reductions from Use of Consumer Products at Institutional and Commercial Facilities [VOC]
FUG-03	Cutback Asphalts [VOC]
CMB-01	NO _x Reduction from Non-RECLAIM Ovens, Dryers and Furnaces [NO _x]
CMB-03	Further NO _x Reductions from Space Heaters [NO _x])
CMB-04	Natural Gas Fuel Specifications [NO _x]
BCM-02	PM Emission Hot Spots – Localized Control Program [PM]
BCM-03	Emission Reductions from Wood Burning Fireplaces and Wood Stoves [PM]
BCM-04	Additional PM Emission Reductions from Rule 444 – Open Burning [PM]
BCM-05	Emission Reductions from Under-Fired Charbroilers [PM]
MCS-05	Emission Reductions from Non-Dairy Livestock Waste [VOC and NH ₃]
MCS-07	Application of All Feasible Control Measures [All Pollutants]

TABLE 1
(Continued)

Emission Growth Management	
Number	Title
EGM-01	Emission Reductions from New or Redevelopment Projects [NO _x , VOC and PM _{2.5}]
EGM-02	Emission Budget and Mitigation for General Conformity Projects [All Pollutants]
EGM-03	Emissions Mitigation at Federally Permitted Projects [All Pollutants]
Mobile Source Control	
Number	Title
MOB-01	Mitigation for Federal Sources [NO _x]
MOB-02	Extended Exchange Program [All Pollutants]
MOB-03	Backstop Measures for Indirect Sources of Emissions from Ports and Port-Related Facilities [All Pollutants]
MOB-04	Emission Reductions from the Carl Moyer Program [NO _x and PM]

Emission reduction associated with the District's SIP commitment to adopt and implement short-term VOC, PM₁₀, NO_x, and SO_x emission reductions from sources under the District's jurisdiction will be prepared in the next several months based on revised emission inventories and public comments on strategies. Once the SIP commitment is accepted, should there be emission reduction shortfalls in any given year, the District would identify and adopt other measures to make up the shortfall. Similarly, if excess emission reductions are achieved in a year, they can be used in that year or carried over to subsequent years if necessary to meet reduction goals.

Coating and Solvents

The category of coatings and solvents is primarily targeted at reducing VOC emissions from VOC-containing products such as coatings and solvents. This category includes three control measures that are based on additional emission reductions from lubricants, institutional and commercial consumer products and other miscellaneous coatings and an introduction of consumer product labeling, representing an expansion of the current Clean Solvent Certification Program.

Petroleum Operations and Fugitive VOC Emissions

This category pertains primarily to operations and materials associated with the petroleum, chemical, and other industries. Within this category, there is one control measure targeting fugitive VOC emissions with improved leak detection and repair.

Other measures include reductions from gasoline transfer and dispensing, pipeline and storage tank degassing and cutback asphalt facilities.

Combustion Sources

This category includes four measures targeting stationary combustion equipment. There is one control measure reducing NO_x from non-RECLAIM ovens, dryers, and furnaces. A second measure targets the reduction of SO_x emissions from RECLAIM facilities. In addition, there is one new control measure that seeks to further reduce NO_x emissions from space heaters. The last measure seeks to specify fuel standards for natural gas used in stationary sources as a means of preventing potential increase in NO_x emissions.

Fugitive Dust Sources

This category includes three new control measures which would require further reductions from PM control devices and a localized control and enhanced open burning programs. The localized controls would be introduced in high PM areas to ensure PM₁₀ attainment demonstration. There are also two control measures that have been carried over from the 2003 AQMP, i.e., PM reductions from wood stoves and charbroilers.

Multiple Component Sources

There are a total of seven control measures in this category. The first measure seeks reductions of all criteria pollutants through the modernization of permitted equipment and the application of supercompliant materials. The approach behind this measure is to either replace or retrofit existing equipment at the end of a pre-determined life span with today's BACT and utilize today's supercompliant materials at a future date. In addition a new control measure has been introduced to promote energy efficiency and conservation.

Two of these control measures are included in this category that address VOC and ammonia emissions from non-dairy livestock waste and composting operations. A third measure promotes the use of lighter color roofing, road materials, or tree planting. The last two measures seek to minimize emissions during equipment start up and shut down and reduce emissions by applying the state requirement of all feasible control measures.

Compliance Flexibility Programs

This category includes a control measure carried-over from the 2003 AQMP that enhances regulatory compliance by providing additional flexibility and compliance options thereby lowering compliance costs and incentivizing early reductions and advancement of clean technologies. A second control measure was mentioned in the 2003 AQMP but not listed as a Control Measure. This measure is a pilot program that could be used by the Petroleum Refining businesses as a compliance option to achieve their emission reduction obligations through either on-site or off-site controls.

Emission Growth Management

There are three control measures within this category. The first measure addresses emission reductions from new or redevelopment projects. Several options are being considered. Projects could be evaluated for significant air emissions pursuant to the California Environmental Quality Act (CEQA). The AQMD seeks to provide the lead agencies a voluntary mitigation fee program to mitigate emissions that are remaining after applying feasible mitigation measures. Another option would be a rule specifying mitigation measures for development projects. The last two new control measures address the General Conformity projects. The first of these measures creates an emissions budget and mitigation program for these projects. The second measure addresses the impacts of federally permitted projects on the District.

District's Mobile Source Control Measures

The District is proposing four control measures for mobile sources. One control measure seeks to impose a mitigation fee program on federal sources such as planes, trains, and ships in order to fund emission reduction projects. The second measure promotes accelerated turn-over of in-use small off-road engines (SORE) and other engines such as recreational outboard engines through expanded voluntary exchange programs. The third measure introduces backstop measures for indirect sources of emissions from ports and port-related facilities. The fourth measure proposes to take credit for the emission reductions achieved through past and future projects funded under the Carl Moyer Program.

District's Long-Term Control Measure

The District is also proposing five long-term measures. The first measure examines further reductions of VOC by lowering reactivity. The second measure addresses the offsetting of emissions due to the introduction of natural gas with a wobbe index greater than 1360 and future BARCT assessment for NO_x RECLAIM facilities. The third measure addresses further fugitive VOC reductions from such sources as gasoline transfer and dispensing, petroleum refining and chemical plants. The fourth control measure relies on concurrent reductions in criteria pollutants associated with implementation of strategies to reduce global warming gases as specified in Assembly Bill 32. The fifth long-term measure seeks further VOC reductions from various mobile source categories beyond the reductions from the short-term measures.

RULE EFFECTIVENESS

The 1990 federal Clean Air Act requires that emissions inventories be adjusted to reflect the rule effectiveness. As defined by EPA, rule effectiveness reflects how emission reductions due to implementation of a regulatory program are estimated. EPA suggests a default value of 80 percent if emission reductions are estimated based on projected

control efficiencies and emission factors. If a higher rule effectiveness value is used the District needs to demonstrate how these emission reductions will be achieved.

As described below under Rule Compliance and Test Methods, the compliance demonstration for each proposed control measure, where the District accounted for emission reductions, identifies the compliance mechanisms such as recordkeeping, inspection and maintenance activities, etc., and test methods such as District, ARB, and EPA approved test methods. The District's on going source testing and on-site inspection programs also strengthen the status of compliance verification. In addition, the District conducts workshops, compliance education programs to inform facility operators on rule requirements and assist them in performing recordkeeping and self inspections. These compliance tools are designed to ensure rule compliance would be achieved on a continued basis. As a result, the control measures proposed in this appendix with quantifiable emission reductions are based on a rule effectiveness of 100 percent.

FORMAT OF CONTROL MEASURES

Included in each control measure description is a title, summary table, description of source category (including background and regulatory history), proposed method of control, estimated emission reductions, rule compliance, test methods, cost effectiveness, and references. The type of information that can be found under each of these subheadings is described below.

Control Measure Number

Each control measure is identified by a control measure number such as "CM #2007MCS-04" located at the upper right hand corner of every page. "CM #" is the abbreviation for the "control measure number" and is immediately followed by the year of the AQMP revision.

The next three-letter designation, "CTS" represents the abbreviation for a source category or specific programs. For example "CTS" is an abbreviation for "Coatings and Solvents." The following provides a description of the abbreviations for each of the measures.

- CTS Coatings and Solvents
- CMB Combustion Sources
- FUG Fugitive Emissions
- MCS Multiple Component Sources

- BCM Best Available Control Measures for Fugitive Dust Sources
- FLX Compliance Flexibility Programs
- EGM Emission Growth Management
- MOB Mobile Source Programs
- LTM Long-Term Measures

If the measure is based on a control measure from the 2003 AQMP, the former control measure number appears in parentheses after the 2007 AQMP number. For example, 2007 AQMP Control Measure CM #2007CMB-04 Natural Gas Fuel Specifications would also have the designation (CM #2003MSC-07).

Title

The title contains the control measure name and the major pollutant(s) controlled by the measure. Titles that state “Control of Emissions from...” indicate that the measure is regulating a new source category, not presently regulated by an existing source-specific District rule. Titles that state “Further Emission Reductions of” imply that the measure would result in an amendment to an existing District rule.

Summary Table

Each measure contains a table that summarizes the measure that is designed to identify the key components of the control measure. The table contains a brief explanation of the source category, control method, emission reductions, control costs, and implementing agency.

Description of Source Category

This section provides an overall description of the source category and the intent of the control measure. The source category is presented in two sections, background and regulatory history. The background has basic information about the control measure such as the number of sources in the Basin, description of emission sources, and pollutants.

The regulatory history contains information regarding existing regulatory control of the source category such as applicable District rules or regulations and if the source category was identified in the 1999 or prior AQMPs.

Proposed Method of Control

The purpose of this section is to identify potential control options an emission source can use to achieve emission reductions. If an expected performance for a control option is

provided, it is intended for informational purposes only and should not be interpreted as the targeted overall control efficiency for the proposed control measure. To the extent feasible, the overall control efficiency for a control measure should take into account achievable controls in the field by various subcategories within the control measure. A more detailed type of this analysis is typically conducted during rulemaking, not in the planning stage. It has been the District's long standing policy not to exclude any control technology and have intentionally identified as many control options as possible to spur further technology development. Therefore, potential control options described in this section do not ensure their viability when subject to further technology assessment conducted during the rulemaking process.

In addition to the proposed control methods discussed in each control measure, affected sources may have the option of partially satisfying the emission reduction requirements of each control measure with compliance flexibility programs currently available, or those that will become available in the future from the on-going implementation of control measure CM #2007FLX-01. Examples of compliance flexibility programs currently available include Rule 2020 – RECLAIM Reserve and the pilot credit generation rules under Regulation XVI – Mobile Source Offset Programs. Future enhancements to Regulation XVI may include additional opportunities to generate and use credits from mobile sources which could advance the utilization of these credit rules and other compliance flexibility programs similar to regulation XVI.

Emissions Reduction

The emission reductions are estimates based on the baseline inventories prepared for the 2007 AQMP and are provided in the Control Measure Summary Table. The emissions data are based on the annual average inventory for all five criteria pollutants. The planning inventory adjusts the emissions by taking into consideration a source category's seasonal variations. The emissions affecting ozone concentration (i.e., VOC and NO_x) are presented under the Summer Planning Inventory. The emissions section of the summary table includes the 2002, 2014, and 2020 inventory. The 2014 and 2020 emission projections reflect implementation of District adopted rules. Based on the expected reductions associated with implementing the control measure, emission data are calculated for 2014 and 2020 assuming the implementation of the control measure in the absence of other competing control measures.

The emission reductions listed in the summary table represent the current best estimates, which are subject to change during rule development. As demonstrated in previous rulemaking, the District is always seeking maximum emission reductions when proven technically feasible and cost-effective. For emission accounting purposes, a weighted average control efficiency is calculated based on the targeted controls. The concept of weighted average acknowledges the fact that a control measure or rule consists of several subcategories, the emission reduction potential for each subcategory is a function of

proposed emission limitation and the associated emission inventory. Therefore, the use of control efficiency to estimate emission reductions does not represent a commitment by the District to require emission reductions uniformly across source categories. In addition, due to the current structure of emission inventory reporting system, a control measure may partially affect an inventory source category (e.g., certain size of equipment or certain level material usage). In this case, an impact factor is incorporated into the calculation of a control efficiency to account for the fraction of inventory affected. During the rule development, the most current inventory will be used. However, for tracking rate-of-progress on the SIP emission reduction commitment, the approved AQMP inventory will be used. More specifically, emission reductions due to mandatory or voluntary, but enforceable, actions will be credited under SIP obligations.

Rule Compliance

This section was designed to satisfy requirements in the 1990 Clean Air Act in which EPA has indicated that it is necessary to have a discussion of rule compliance with each control measure. This section discusses the recordkeeping and monitoring requirements envisioned for the control measure. As discussed under this section of the control measure, the District would continue to verify rule compliance through site inspections and submittal of compliance plans.

Test Methods

In addition to requiring recordkeeping and monitoring requirements, EPA has stated that “An enforceable regulation must also contain test procedures in order to determine whether sources are in compliance.” This section of the measure identifies appropriate approved District, ARB, and EPA source test methods.

Cost Effectiveness

The Discounted Cash Flow (DCF) method is used to calculate the cost-effectiveness of each control measure. As control measures undergo the rule making process, more detailed control costs will be developed, and therefore, may differ from the data presented here.

The cost effectiveness may overestimate actual levels because the number of affected facilities may also include those that presently are not regulated by the District. As additional information on costs and more accurate numbers of affected facilities becomes available, the cost effectiveness will be revised and analyzed in the socioeconomic assessment report of the 2007 AQMP.

Implementing Agency

This section identifies the agency(ies) responsibility for implementing the control measure. Also included in this section is a description of any jurisdictional issues that may affect the control measure's implementation.

References

This section identifies directly cited references, or those references used to provide general background information.

GROUP 1

Coatings and Solvents

EMISSION REDUCTIONS FROM LUBRICANTS [VOC]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	INDUSTRIAL LUBRICANTS		
CONTROL METHODS:	PHASE I: REFINE EMISSIONS INVENTORY IDENTIFY LOW-EMITTING ALTERNATIVES AND ENCOURAGE INDUSTRIES TO SWITCH FROM HIGH VOC CONTENT LUBRICANTS TO ALTERNATIVE SOLVENTS		
	PHASE II: RULE DEVELOPMENT TO LIMIT EMISSIONS AT THE SOURCE AND/OR LIMIT VOC CONTENT AT POINT OF SALE/USE		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	2002	2014	2020
VOC INVENTORY	6.6	7.6	8.0
VOC REDUCTION		<u>1.5</u>	<u>1.6</u>
VOC REMAINING		6.1	6.4
SUMMER PLANNING INVENTORY	2002	2014	2020
VOC INVENTORY	6.6	7.6	8.0
VOC REDUCTION		<u>1.5</u>	<u>1.6</u>
VOC REMAINING		6.1	6.4
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

The proposed control measure seeks to reduce VOC emissions from the use of lubricants which are utilized by a variety of different industries and new facility processes.

Background

A control measure was included in the 2003 AQMP to reduce VOC emissions from miscellaneous industrial coatings and solvent operations. The total estimated annual average emissions from these sources, without mitigation, were 13.9 tons per day in 2006 and 15.2 tons per day by 2010.

This 2007 AQMP control measure would seek to reduce VOC emissions from industrial lubricants, a category under solvent operations, over a defined implementation period. Lubricants include products such as coolants in manufacturing processes; stamping fluids; vanishing oils; and cutting, forming, and honing oils, and are used by various companies in the South Coast Air Basin including,

but not limited to, machine shops, auto rebuilders, and auto parts manufacturers. Many lubricants and their additives, such as rust and corrosion inhibitors, are at least 50 percent VOC solvents and are believed to emit a significant amount of VOCs. In addition, mineral spirits and kerosene used to dilute lubricants contain traces of benzene, toluene, and xylene, which are all classified as Hazardous Air Pollutants (HAPs) by the EPA and Toxic Air Contaminants (TACs) by the state of California. Benzene is established as a human carcinogen and toluene and xylene, respectively, have been proven to cause central nervous system damage and birth defects.

Regulatory History

As stated in the previous section, lubricants are categorized under miscellaneous solvent operations. They are currently subject to Rule 442, "Usage of Solvents," which reduces VOC emissions from VOC-containing materials that are not subject to VOC limits in any Regulation XI rule. Currently, there are no regulations or emissions restrictions specifically concerned with industrial lubricants in place at the local, state, or federal levels.

PROPOSED METHOD OF CONTROL

There would be two potential implementation phases, enacted in an order that would bring about reductions in the most expedient manner. The first phase would involve refining the emissions inventory and identifying low-emitting alternatives to existing high-VOC lubricants and encouraging industries currently using high-VOC content products to voluntarily switch over to less-polluting ones. The second phase would involve developing a rule that would further reduce source emissions by either placing an overall emissions limit by source, or by limiting VOC content in lubricant formulations at the point of sale and/or use. This reduction is based on the fact that a smaller fraction of all industrial lubricants are virtually 100 percent VOC. Implementation of this control measure would target a minimum overall VOC reduction of 20 percent or 1.3 tons per day by year 2014.

There are important points that should be noted when discussing these phases. First, there are low- and non-emitting alternatives to petroleum-based lubricants available on the market, including synthetics, semi-synthetics, and vegetable oils. Thus, feasible reduction requirements could apply to the end user, as well as be imposed at the point of sale. A second notable point is that different types of machinery require different lubricant formulations. It should be made certain that the technological feasibility and cost impact of all alternatives to specific lubricant materials be assessed. Further consideration must also be given to possible toxic constituents in any reformulation or other alternatives.

EMISSIONS REDUCTION

Feasible emission reductions from currently available alternative products are estimated to be 1.6 tpd in the year 2020.

RULE COMPLIANCE

Rule compliance would be achieved with compliance requirements under Regulation XI - Source Specific Rules. Recordkeeping and monitoring requirements would be similar to Rule 109.

TEST METHODS

To Be Determined

COST EFFECTIVENESS

Since compliant materials are currently available and used in the industry, the cost effectiveness appears to be favorable. Cost data will be available upon completion of a District-sponsored study by Fall of 2006.

IMPLEMENTING AGENCY

The District has authority to regulate VOC emissions from industrial coating and solvent operations, under which industrial lubricants are categorized.

REFERENCES

EPA Proposal Submittal. "Alternatives to VOC Emitting Lubricants and Rust Inhibitors" 2004.

CLEAN COATINGS CERTIFICATION PROGRAM [VOC]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	COATING MATERIALS		
CONTROL METHODS:	STEP I: DEVELOPMENT OF CERTIFICATION PROGRAM FOR COATINGS WITH LOW-, ULTRA LOW-, OR ZERO-VOC CONTENT		
	STEP II: ALLOW FOR REDUCTION OF EMISSION FEES TO MANUFACTURERS OF COATINGS WITH LOW-VOC CONTENT		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	2002	2014	2020
VOC INVENTORY	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD
VOC REMAINING		TBD	TBD
SUMMER PLANNING INVENTORY	2002	2014	2020
VOC INVENTORY	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD
VOC REMAINING		TBD	TBD
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

Background

Although industrial coatings have been subject to controls for many years, they remain a significant source of VOC emissions. This control measure would seek to implement a VOC content certification program for lower VOC coatings, similar to that for Clean Air Solvents, which would influence industrial and other consumers' purchase decisions toward products with lower emissions. Manufacturers would then be encouraged to lower their VOC content, thus possibly reducing emissions beyond what traditional control rules would mandate. VOC emissions can cause adverse health impacts, such as headaches, nausea, allergic reactions, and other health problems in humans if inhaled. They also contribute to the formation of ozone and PM_{2.5}, which can affect pulmonary functions and limit visibility.

Regulatory History

Previously, under Rule 1171 – Solvent Cleaning Operations, Clean Air Solvent certificates were issued to manufacturers, distributors, or any person for materials that met the criteria for a Clean Air

Solvent. Key to that certification is that, among other criteria, the solvent contains no more than 25 grams of VOC per liter of material and the certification is valid for five years.

PROPOSED METHOD OF CONTROL

First, a certification criteria would be established for distinguishing products that are considered supercompliant (i.e. low-, ultra low-, or zero-VOC content levels), from other compliant products. Secondly, a certification process would be established for those products meeting the “Clean Air Coating” criteria. Certified products would be allowed to use the District certification and promote the products as being “environmental friendly.”

Should the District produce fee related programs for VOC products, consideration will be given to promote super compliant products.

EMISSIONS REDUCTION

To Be Determined

RULE COMPLIANCE

This control measure would seek to amend applicable rules in Regulations II and XI to incorporate a Clean Air Coating Certification Program, similar to that for clean air solvents, as well as be considered in any future regulatory development. The District will explore the feasibility of voluntary and mandatory programs through amendments to Regulation XI and other rules. Conceptually, mandatory versus voluntary participation in the certification program is directly related to the District requiring all architectural coating products to be certified in order to be sold and applied within the AQMD.

Essentially, if the program is voluntary, those coatings that are certified could benefit by not being subject to emission fees whereas non-certified products would pay a fee. Conversely, if it were mandatory, every coating manufacturer would need to certify their products. The fees could be assessed on a sliding scale with super compliant products, requiring little or no emission fees. The method of control would also include public education, outreach, and various marketing elements to help incentivize manufacturers and create consumer awareness and demand.

TEST METHODS

To Be Determined

COST EFFECTIVENESS

Cost-effectiveness has not been determined for this measure.

IMPLEMENTING AGENCY

Both the ARB and the District have the authority to regulate consumer products emissions.

CONSUMER PRODUCT LABELING AND EMISSION REDUCTIONS FROM USE OF CONSUMER PRODUCTS AT INSTITUTIONAL AND COMMERCIAL FACILITIES [VOC]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY: CONSUMER PRODUCTS

STEP I: DEVELOPMENT OF LABELING PROGRAM FOR
CONSUMER PRODUCTS.

CONTROL METHODS:

STEP II: LIMITATION OF USE FOR CONSUMER PRODUCTS,
OTHER THAN ULTRA LOW- OR ZERO-VOC PRODUCTS, AT
HIGH VOLUME COMMERCIAL AND INSTITUTIONAL
FACILITIES.

EMISSIONS (TONS/DAY):

ANNUAL AVERAGE	2002	2010	2014
VOC INVENTORY	24	23	24
VOC REDUCTION		TBD	TBD
VOC REMAINING		TBD	TBD
CONTROL COST: TO BE DETERMINED			
IMPLEMENTING AGENCY: ARB AND DISTRICT			

DESCRIPTION OF SOURCE CATEGORY

Background

Consumer products are defined under the California Health and Safety Code (HSC) as chemically formulated products used by institutional and household consumers. They include products such as detergents; cleaning compounds; polishes; floor finishes; cosmetics; personal care products; home, lawn, and garden products; disinfectants; sanitizers; aerosol paints; and automotive specialty products. Paint products, and furniture or architectural coatings are not included. The California Air Resources Board (ARB) further defines institutional cleaning as the cleaning of building or facility components including, but not limited to, floors, ceilings, walls, windows, doors, stairs, bathrooms, furnishings, and exterior surfaces of office equipment. Many of these commonly used consumer products have high-VOC contents and are the focus of ARBs efforts in the reduction of smog in California. In the year 2005, the contribution of VOCs from Consumer Products used in California was estimated at 245 tons per day or about 110 tons per day for the South Coast Air Quality Management (District). The inventory claim for this measure is an estimate of emissions from those consumer products used at institutional and commercial facilities.

This control measure would seek to reduce VOCs from consumer products used at commercial and institutional facilities by and through the use of marketing strategies and regulatory mandates. VOC emissions can cause adverse health impacts, such as headaches, nausea, allergic reactions, and other health problems in humans if inhaled. They also contribute to the formation of ozone and PM10, which can affect pulmonary functions and limit visibility.

This control measure would seek to develop new rules to establish a VOC labeling program, and to establish usage limitations for high volume users resulting in overall reductions in VOCs. Staff research has shown that there are low-and zero-VOC commercial and institutional products available that are below current and proposed limits in ARBs Consumer Products Regulation. For example, a local supplier of environmentally friendly cleaning products, Natural Solutions, has over twenty products available for commercial and institutional use ranging from 0 to 4% by weight of VOCs prior to dilution. Similar products under the current and future limits of ARBs Consumer Product Regulation range from 1% to 4% as applied, implying typically higher VOC ranges prior to dilution creating an even larger comparative differential.

Regulatory History

The California Air Resources Board (ARB) has the authority to regulate consumer products under Section 41712 of the California Health and Safety Code (HSC). Local Air Pollution Control Districts may restrict the use of consumer products at stationary and area sources of emissions, to limit the overall contribution of VOCs attributable to the formation of smog, may regulate consumer products that are not already regulated by ARB, and potentially may limit the use of consumer products at institutional and commercial sources.

PROPOSED METHOD OF CONTROL

Commercial and institutional consumer products used at facilities conducting business within the District would be targeted under this control measure, which would be implemented in two steps through specific rule development.

First, a labeling program would be established designating the form of the label and labeling criteria. The labels would distinguish products that are super compliant containing ultra low- or zero-VOC content levels, otherwise referred to as “green” products, from products with higher-VOC content. The required labels would have an appearance that is distinctive, prominent, and “friendly” (as opposed to technical). One possibility would be an image of a blue ribbon or “medal” for products that meet “Low Air Polluting” criteria as defined under District regulations.

Second, following implementation of the labeling program, a usage limitation or a prohibition of use would be adopted for consumer products other than ultra low- or zero-VOC products at high volume commercial and institutional facilities to the extent that the District is able to under State law, or the District will request ARB to adopt such a rule.

EMISSIONS REDUCTION

Emission reductions cannot be quantified at this time, but are anticipated to be significant from greater use of super compliant low- and zero-VOC products.

RULE COMPLIANCE

Step I: New labeling program for manufacturers or distributors with criteria developed under a public process.

Step II: Create a usage limitation or a prohibition of use, or the District will request ARB to adopt such a rule.

TEST METHODS

United States Environmental Protection Agency (USEPA) Reference Method 24 (Code of Federal Regulations, Title 40, Part 60, Appendix A). The exempt compounds' content shall be determined by the District Method 303 (Determination Exempt Compounds) contained in the District "Laboratory Methods of Analysis for Enforcement Samples" manual; or,

District Method 304 [Determination of Volatile Organic Compounds (VOC) in Various Materials] contained in the District "Laboratory Methods of Analysis for Enforcement Samples" manual.

COST EFFECTIVENESS

TBD

IMPLEMENTING AGENCY

Step I to be implemented by the District with Step II under ARB and/or District regulatory authority.

GROUP 2

Petroleum Operations and Fugitive VOC Sources

IMPROVED LEAK DETECTION AND REPAIR [VOC]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY:	FUGITIVE EMISSION SOURCES
CONTROL METHODS:	PHASE I: PILOT PROGRAM – OPTICAL GAS IMAGING (SMART LDAR) PHASE II: FULL IMPLEMENTATION OF SMART LDAR PROGRAMS
EMISSIONS (TONS/DAY)	NOT DETERMINED
CONTROL COST:	UP TO \$100,000 PER UNIT
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

Control Measure #FUG-01 is a new control measure that targets a variety of fugitive emissions sources including, but not limited to, oil and gas production facilities, petroleum and chemical products processing, storage and transfer facilities, marine terminals, and other sources contributing to fugitive emissions. Most of these facilities are required under District and federal rules to maintain a leak detection and repair (LDAR) program that involves individual screening of all of their piping components.

The scope of Control Measure FUG-01 is to enhance the effectiveness of existing LDAR programs by identifying and repairing leaks sooner and in a manner that is less time consuming and labor intensive and expand the applicability of LDAR programs to areas currently not covered by existing rules such as harbor vessels. For this purpose, the new control measure uses recently developed technology, called optical gas imaging, to detect leaks (Smart LDAR). There are two types of optical gas imaging instruments: active and passive. The active type uses a laser beam that is reflected by the background; and the attenuation of the beam traversing through a hydrocarbon cloud provides the optical image. The passive type uses the ambient illumination to detect the difference in heat radiance of the hydrocarbon cloud. For either type, the instrument displays an image of the hydrocarbon plume.

Background

Fugitive VOC leaks have been the subject of control measures in previous AQMPs since they are ozone precursors and contribute to formation of smog. Several District rules that affect petroleum and chemical-related industries, such as oil refineries, oil and gas production fields, natural gas processing plants, pipeline transfer stations and chemical plants have some kind of requirement involving the periodic inspection of piping components and the detection and repair of leaks.

Fugitive leaks are detected with an organic vapor analyzer (OVA) that measures the leak rate for each component, using U.S. EPA Reference Method 21. In the early 1970s, U.S. EPA initiated the Petroleum Refinery Assessment Study, which developed average emission factors for each type of piping component (valve, flange, pump, etc) and concluded that mass emission rates are dependent of the phase of the process stream (gas/vapor, light liquid and heavy liquid) and the relative volatility of the liquid stream.

Mass emissions from fugitive leaks can be calculated based on correlation equations developed by the U.S. EPA based on data from the 1994 Refinery Equipment Leak Report. Mass emissions are calculated by inserting the measured leak rates into the correlation equations specific for each type of component, such as valve, flange, pump, compressor, etc.

The current LDAR program has been successful in significantly reducing fugitive VOC emissions from a variety of sources. However, the latest technology provides opportunities for further improvements in the efficiency of the conventional LDAR program and for further reductions.

Regulatory History

Fugitive emissions are currently regulated under various AQMD rules that require a LDAR program: Rules 462 – Organic Liquid Loading, 463 – Storage of Organic Liquids, 1142 – Marine Vessel Tank Operations, 1173 – Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum and Chemical Plants, 1176 – Sumps and Wastewater Separators, and 1178 - Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities.

PROPOSED METHOD OF CONTROL

This control measure will be implemented in two phases: Phase I will be a pilot LDAR program involving familiarization with the new technology and establishing implementation protocols, and will involve the identification of facilities/industries currently subject to LDAR programs as well as others that are not where the new technology can successfully be utilized. Based on the results of Phase I, fugitive VOC rules, if feasible, will be amended under a subsequent phase (Phase II) to enhance their applicability, effectiveness, and to further reduce emissions.

EMISSIONS REDUCTION

The emission reductions from this control measure have not been determined.

RULE COMPLIANCE

Rule compliance would be similar to compliance requirements under existing Rules 462, 463, 1142, 1173, 1176, and 1178. Recordkeeping and monitoring requirements would be similar to Rule 109.

TEST METHODS

Test methods include the following:

U.S. EPA Reference Method 21 - Determination of Volatile Organic Compounds Leaks.

Federal Register Vol. 71, No. 66 April 6, 2006 - Alternative Work Practice To Detect Leaks From Equipment.

COST EFFECTIVENESS

There are no claimed emission reductions associated with this control measure and therefore cost effectiveness is not calculated.

IMPLEMENTING AGENCY

The District has authority to regulate fugitive VOC emissions sources.

REFERENCES

U.S. EPA – Protocol for Equipment Leak Emission Estimates, November 1995.

Federal Register /Vol. 71, No. 66/April 6, 2006, Alternative Work Practice To Detect Leaks From Equipment.

EMISSION REDUCTIONS FROM GASOLINE TRANSFER AND DISPENSING [VOC]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	GASOLINE TRANSFER AND DISPENSING		
CONTROL METHODS:	IMPROVE THE IMPLEMENTATION OF THE ENHANCED VAPOR RECOVERY REGULATION		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	2002	2014	2020
VOC INVENTORY	17.3	17.3	18.4
VOC REDUCTION		<u>3.7</u>	<u>3.9</u>
VOC REMAINING		13.6	14.5
SUMMER PLANNING INVENTORY	2002	2014	2020
VOC INVENTORY	17.3	17.3	18.4
VOC REDUCTION		<u>3.7</u>	<u>3.9</u>
VOC REMAINING		13.6	14.5
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to reduce VOC and toxic emissions from gasoline dispensing facilities (GDFs) by improving implementation of the Enhanced Vapor Recovery (EVR) Regulation.

Background

GDFs represent the second largest emission source category under the District's regulatory authority, following architectural coatings. Emissions from GDFs are regulated by the Enhanced Vapor Recovery (EVR) regulation of the California Air Resources Board (CARB) and the District's Rule 461.

In March 2000, California Air Resources Board (CARB) amended the EVR to reduce VOC and toxic emissions from the transfer and dispensing of gasoline at GDFS (service stations). The EVR includes testing and certification procedures to improve the performance and specifications of both Phase I and Phase II vapor recovery systems.

The EVR for Phase I (one module) included the improvements of the spill containment and covers; rotatable product and vapor adaptors; overfill prevention device; and pressure vacuum vent gauges. Phase I module for both the balance and the vacuum assist systems was completely implemented on April 1, 2005.

The EVR for Phase II (five modules) includes, but is not limited to, the onboard refueling vapor recovery (ORVR), and the in-station diagnostic (ISD). The ORVR routes gasoline vapor displaced during vehicle fueling to the onboard canister on the vehicle. The ISD is designed to provide continuous real-time monitoring of vapor collection and containment efficiencies; alert the GDF operator when a failure mode is detected so that corrective action can be taken; shut down the dispensers, if repairs are ignored; and provide compliance records. Presently, the ISD is only certified and installed on the Healy VR 202 (Veeder-Root ISD) system. The ISD for the balance system and other vacuum assist systems are in the testing program phase (180 days) and the complete implementation of the ISD for both balance and vacuum assist systems is scheduled for 2009-2010.

There are approximately 3400 retail GDFs and 1500 non-retail GDFs in the Basin with a total approximate throughput of 7 billion gallons per year. Current regulatory structure seeks to reduce the uncontrolled emissions inventory estimated at 197 tpd by 95 percent. However, because of poor compliance rates, the reduction target remains elusive. Through successive amendments to EVR regulation and Rule 461, CARB and the District attempted to address this chronic problem.

Regulatory History

In an effort to significantly improve the compliance rates from this industry by monitoring emissions, the District in 2000 amended Rule 461 and significantly enhanced the monitoring of source testing requirements of this rule as well as its enforcement presence. The emission reduction from the 2000 amendment was estimated to be 27.3 tpd. While the compliance rates improved significantly, they are far from being satisfactory. Based on the current compliance status (75 percent), the remaining VOC emissions from GDF operations are estimated to be 17.3 tpd.

Presently, Rule 461 requires 95 percent control efficiency for both Phase I and Phase II vapor recovery systems. On April 2005, CARB requested the installation of EVR Phase I and Phase II on all GDFs. EVR is projected to increase the control efficiency of the vapor recovery systems from 95 percent to 98 percent.

Effective September 2005, CARB required all GDFs dispensing units to be compatible with the integral ORVR vapor recovery systems installed on late model motor vehicle.

PROPOSED METHOD OF CONTROL

The proposed control measure includes the following potential actions:

1. Improve the functions of the ISD to include a yellow alert signal which would indicate the potential for the failure thereby allowing preventative repairs prior to system failure. Presently, the ISD alert is restricted only to the failure of the vapor recovery systems (red alert) which will result in emissions loss, with the associated system failure.
2. Enhance the ISD alerting range to match the CARB Executive Orders standards. For example, the Executive Order and the ISD ranges for the vapor/liquid (V/L) test are 0.95

- 1.15 and 0.24 – 2.01, respectively. Therefore, the ISD starts after 75 percent degradation of the vapor recovery system.
- 3. Disallow the use of the ISD reset button unless and until all the defective components are repaired and the vapor recovery system operates in full compliance. Currently, the ISD system is equipped with a reset button, which allows a failed vapor recovery system to be reset to dispense gasoline without repair of the system.
- 4. Seek implementation of the ISD on all the balance and the vacuum assist systems.
- 5. Install a “shut down” sensor or mechanism on the fuel line of the dispenser to stop fueling if the fuel filters are blocked and the fueling flow rate drops below the system certification standards. After the implementation of the ORVR requirement, the fuel filters integrity is essential to maintain the appropriate liquid flow rate (as specified by the CARB Executive Order). Partially blocked fuel filters decrease the fuel flow rates which deactivate the pressure sensor in the nozzles and allow air ingestion and vapor growth in the underground tanks.

EMISSIONS REDUCTION

The estimated emission reductions are summarized in the control measure summary.

RULE COMPLIANCE

Compliance with this control measure would be similar to the compliance requirements under existing Rule 461.

TEST METHODS

The control measure will implement the EVR tests procedures: TP-201.3 (Leak Decay), TP-201.4 (Back Pressure), TP-201.5 (Vapor/liquid ratio A/L), and TP-201.6 (Liquid Removal).

COST EFFECTIVENESS

The cost effectiveness of this control measure has not yet been specifically determined. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide specific cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

The District has the authority to adopt and enforce rules and regulations (Health and Safety Code §40001).

REFERENCES

“Retail Gasoline Dispensing Facility Inspection, Rule 461 Compliance Audit in the South Coast AQMD,” Second Quarter 1997, South Coast Air Quality Management District.

“Emissions Inventory Procedural Manual Volume III Methods for Assessing Area Source Emissions,” Section 4.10 – Gasoline Dispensing Facilities, October 1997, Air Resources Board.

South Coast Air Quality Management District, “Final Staff Report For Proposed Amended Rule 461 - Gasoline Transfer and Dispensing,” April 21, 2000.

“Enhanced Vapor Recovery Technology Review,” Monitoring and Laboratory Staff Report, California Air Resources Board, April 2002.

“Enhanced Vapor Recovery Update,” Sixth Annual California Unified Program Conference, February 5, 2004.

FURTHER EMISSION REDUCTIONS FROM CUTBACK ASPHALTS [VOC]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:		ASPHALT PAVING	
CONTROL METHODS:		LIMITING USE OF CUTBACK ASPHALT	
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	2002	2014	2020
VOC INVENTORY	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD
VOC REMAINING		TBD	TBD
SUMMER PLANNING INVENTORY	2002	2014	2020
VOC INVENTORY	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD
VOC REMAINING		TBD	TBD
CONTROL COST:		TO BE DETERMINED	
IMPLEMENTING AGENCY:		AQMD	

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to reduce emissions from asphalt paving applications by limiting the use of cutback asphalt and/or replacing it with emulsified asphalt.

Background

Cutback and emulsified asphalts are used in nearly all paving applications. Cutback asphalt is prepared by blending (or “cutting back”) asphalt cement with petroleum distillates such as gasoline, naphtha, kerosene, or slow volatile oils. Emulsified asphalt is made by blending asphalt cement with a majority of non-volatile emulsifying agent (e.g. water or soap) and some light petroleum distillates used as diluents. As a result, emulsifying asphalt has a lower emission potential than cutback asphalt. In 1977, EPA issued a Control Technology Guidelines (CTG) defining Reasonably Available Control Technology (RACT) for cutback asphalt and indicating that the use of emulsified asphalt in place of cutback asphalt would reduce almost all VOC emissions. EPA provided additional guidelines for cutback asphalts in its “Blue Book” 1) No CTG cutoff level; 2) seasonal exemptions (i.e. cutback asphalt is not recommended during ozone season) as opposed to limitation on temperature where paving is applied (e.g. less than 50 degree F); and 3) exemptions for use solely as penetrating prime coat and when stockpiled for extended period of time which is longer than 1 month.

Regulatory History

AQMD Rule 1108 – Cutback Asphalt requires that no person shall sell, or offer for sale for use, or use medium or slow curing grade cutback asphalt containing more than 0.5% by volume

organic compounds which evaporate at 260 degree C (or 500 degree F) or lower as measured by ASTM Method D402. AQMD Rule 1108.1 – Emulsified Asphalt requires that no person shall sell, or offer for sale for use, or use emulsified asphalt containing more than 3% by volume organic compounds which evaporate at 260 degree C (or 500 degree F) or lower as measured by ASTM Method D244. These rules do not contain seasonal exemptions or usage limitation as in EPA's RACT.

Many states, such as Maine (Regulation, Chapter 131), Missouri (Rule 10 CSR 10-5.310), New York (Rule 211, §211.4), Pennsylvania (Rule 129, §129.64), Rhode Island (Rule 25), have already adopted regulations to implement EPA's RACT to prohibit the use of cutback asphalt during ozone season (May to September). These states provide exemptions for cutback asphalts used as penetrating prime coat, long-life stockpiles, filling potholes, road patching, and dust palliative. In addition, Maine and Rhode Island also require that cutback asphalts contain less than 5% organic compounds which evaporate at 500 degree F, and New York requires that cutback asphalts must be applied only at low ambient temperatures, during other months of the year.

In California, Sacramento (Rule 453) and Placer County (Rule 217) limit the use of cutback asphalts throughout the entire year. Placer County allows the use of cutback asphalts solely during the months of the year when the National Weather Service forecasts that atmospheric temperatures for the 24-hour period following the application will not exceed 10 degree C (50 degree F), and Sacramento allows the use of cutback asphalts solely as prime coat.

As required by federal rule 40 CFR 51.912, the District developed and submitted to U.S. EPA a report to demonstrate that the current District rules and regulations fulfill the 8-hour ozone RACT. During this review, the EPA Region 9 noted that Rule 1108 does not contain RACT for asphalt paving (i.e. seasonal and usage exemptions), and therefore recommended staff to consider this option in the 2007 AQMP. In their RACT submittal to U.S. EPA, the District committed to evaluate the potential of limiting the use of cutback asphalt. This control measure is intended to fulfill this commitment.

PROPOSED METHOD OF CONTROL

The most effective way to control emissions from asphalt paving is to reduce the VOC content in cutback as well as emulsified asphalts. Another strategy is to prohibit the use of high VOC containing asphalts by using seasonal restrictions, or limit its use to certain applications. AQMD will continue further evaluation to determine the possibility of implementing these control options, as well as evaluating further controls.

EMISSIONS REDUCTION

The 2014 and 2020 baseline emissions estimated for asphalt paving are about 0.90 tons per day and 1.40 tons per day, respectively. At this time, it is not possible to quantify precise emission reductions from implementation of this control measure. However, prohibiting the use of cutback asphalt and replacing it with emulsified asphalt could potentially reduce 40% (or 0.5

tpd) of the VOC emissions from this category. Further analysis is needed to quantify accurate emission reductions from this control measure.

RULE COMPLIANCE

Compliance with this control measure would depend on the type of controls implemented, but would be similar to the compliance requirements under existing Rules 1108 and 1108.1.

TEST METHODS

The percent by volume organic compounds which evaporate at 500 degree F or lower) is determined based on ASTM Method D403 (AASHTO T78) for cutback asphalt, and ASTM Method D244 (AASHTO T59) for emulsified asphalt as specified in AQMD Rule 1108 and 1108.1.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not yet been specifically determined. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide specific cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

AQMD has the authority to adopt and enforce rules and regulations to achieve and maintain the state and federal ambient air quality standards in all areas affected by emission sources under its jurisdiction (Health and Safety Code §40001).

REFERENCES

EPA, Control Technology Guidelines - Control of Volatile Organic Compounds from Use of Cutback Asphalt, EPA-450/2-77-037, December 1977.

EPA, EPA "Blue Book" - Issues Relating to VOC Regulations Cutpoints, Deficiencies, and Deviations – Cutback or Emulsified Asphalt, May 25, 1988

EPA, Comment letter from Andrew Steckel (EPA Region 9) to Joe Cassmassi (SCAQMD), 8-Hour Ozone Reasonably Available Control Technology – State Implementation Plan (RACT SIP) Analysis, June 28, 2006.

LADCO-Midwest RPO, Interim Paper – Midwest Regional Planning Organization (RPO) Candidate of Control Measures – Asphalt Paving, March 10, 2006.

New York State, Department of Environmental Conservation, Rules and Regulations, Part 211 – General Prohibitions, §211.4 – Volatile Organic Compounds Prohibited, 1983.

Maine, Department of Environmental Protection, Rules and Regulations, Chapter 131 – Cutback Asphalt and Emulsified Asphalt, 1993.

Missouri, Code of Regulation, 10 CSR 10-5.310, Liquefied Cutback Asphalt Restricted, 1988.

OTC, Summary of Ozone Transport Commission Candidate Control Measures – Asphalt Paving, March 27, 2006.

Pennsylvania, Code of Regulations, §129.64, Cutback Asphalt Paving, Amended 1983.

Placer County Air Pollution Control District, California, Rule 217 – Cutback and Emulsified Asphalt Paving Materials, Amended September 25, 1990.

Rhode Islands, Air Pollution Control Regulation, No. 25, Control of Volatile Organic Compound Emissions from Cutback and Emulsified Asphalt, February 2001.

Sacramento Metropolitan AQMD, California, Rule 453 - Cutback and Emulsified Asphalt Paving Materials, Amended August 31, 1982.

SCAQMD, Rule 1108 – Cutback Asphalt, Amended February 1, 1985.

AQMD, Rule 1108.1 – Emulsified Asphalt, Amended November 4, 1983.

AQMD, Staff Report – AQMD 8-Hour Ozone Reasonably Available Control Technology (RACT) State Implementation Plan (SIP) Demonstration, June 2006.

EMISSION REDUCTIONS FROM PIPELINE AND STORAGE TANK DEGASSING [VOC]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:		PIPELINE AND STORAGE TANK DEGASSING	
CONTROL METHODS:		ENHANCED CONTROL TECHNOLOGY; INCREASED CONTROL EFFICIENCY; ESTABLISH CONCENTRATION LIMITS; EXPAND CURRENT RULE TO INCLUDE PIPELINES, OTHER SOURCE CATEGORIES, SMALLER TANKS SIZES AND OTHER DEGASSING OPERATIONS	
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	2002	2014	2020
VOC INVENTORY	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD
VOC REMAINING		TBD	TBD
SUMMER PLANNING INVENTORY	2002	2014	2020
VOC INVENTORY	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD
VOC REMAINING		TBD	TBD
CONTROL COST:		TBD	
IMPLEMENTING AGENCY:		AQMD	

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to reduce emissions from pipeline and storage tank degassing by requiring enhanced control technology, increased control efficiency, establishing concentration limits, and expanding the source categories, operations and the capacity (size) of affected equipment.

Background

There are approximately 640 floating roof tanks and 750 fixed roof tanks storing petroleum products in refineries, bulk loading, and storage facilities, as well as 11,000 gasoline storage tanks at service stations throughout the Basin, all of which are subject to Rule 1149 – Storage Tank Cleaning and Degassing. Storage tanks must be degassed prior to cleaning, removal, and maintenance. These tanks and their associated piping require periodic cleaning to prevent contamination of the product. Ultimately, the tanks are replaced as they wear out. In addition, some tanks are taken out of service each year so that land can be put to alternative use. This control measure would impact the refineries, chemical plants, gasoline stations, and an unknown number of new facilities in the paint, solvent, adhesive, and ink manufacturing industries.

Regulatory History

Rule 1149 – Storage Tank Cleaning and Degassing was adopted on December 4, 1987, and amended on April 1, 1988 and July 14, 1995. Rule 1149 requires control of VOC emissions during the degassing process. Degassing is the process of removing organic gases from a tank for cleaning purposes. Subject to this rule are the following:

- Above-ground tanks having a capacity of more than 39,630 gallons storing organic liquid with a vapor pressure of more than 2.6 psi or between 19815 and 39,630 gallons having a vapor pressure of more than 3.9 psi.
- Underground tanks having a capacity of more than 500 gallons storing organic liquid with a vapor pressure of more than 3.9 psi.

This rule requires that specific volume(s) of displaced organic gas be vented to control devices that are at least 90 percent efficient for all affected facilities and the submittal of a compliance plan.

PROPOSED METHOD OF CONTROL

This control measure seeks to further reduce emissions from storage tank degassing by requiring enhanced control technology, increased control efficiency, establishing concentration limits for gases vented to the atmosphere. In addition, Rule 1149 could also be amended to regulate smaller tanks; other source categories, such as pipelines; other industries that manufacture or store paint, ink, adhesive, and solvent; and other degassing operations, such as those for repair or product switching, and not just those operations performed as part of tank cleaning.

EMISSIONS REDUCTION

The emissions inventory and emissions reductions have not been determined at this time. Further analysis is needed to quantify accurate emission reductions from this control measure.

RULE COMPLIANCE

Compliance with this control measure would depend on the type of controls implemented, but would be similar to the compliance requirements under existing Rule 1149.

TEST METHODS

U.S. EPA Method 25 – Determination of Total Gaseous Non-methane Organic Emissions as Carbon;

U.S. EPA Method 25A - Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer; or

AQMD Test Method 25.1 - Determination of Total Gaseous Non-methane Organic Emissions as Carbon.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not yet been specifically determined. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide specific cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

The District has the authority to adopt and enforce rules and regulations to achieve and maintain the state and federal ambient air quality standards in all areas affected by emission sources under its jurisdiction (Health and Safety Code §40001).

REFERENCES

Bay Area Air Quality Management District Regulation 8, Rule 5 – Storage of Organic Liquids (November 27, 2002).

San Joaquin United Valley Air Pollution Control District Rule 4623 - Storage of Organic Liquids (May 19, 2005).

Ventura County Air Pollution Control District Rule 74.26 – Crude Oil Storage Tank Degassing Operations (November 8, 1994).

Ventura County Air Pollution Control District Rule 74.27 – Gasoline and ROC Liquid Storage Tank Degassing Operations (November 8, 1994).

South Coast Air Quality Management District Rule 1149 - Storage Tank Cleaning and Degassing (July 14, 1995).

GROUP 3

Combustion Sources

NO_x REDUCTIONS FROM NON-RECLAIM OVENS, DRYERS AND FURNACES [NO_x]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	FACILITIES WITH OVENS, DRYERS & FURNACES		
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	2002	2014	2020
NOx INVENTORY	5.4	6.6	7.1
NOx REDUCTION		<u>3.7</u>	<u>4.0</u>
NOx REMAINING		2.9	3.1
SUMMER PLANNING INVENTORY	2002	2014	2020
NOx INVENTORY	5.8	7.1	7.6
NOx REDUCTION		<u>4.0</u>	<u>4.3</u>
NOx REMAINING		3.1	3.3
CONTROL COST:	\$[4,000 TO 13,000] PER TON NO _x REDUCED		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

Background

Boilers, process heaters, internal combustion engines and turbines are regulated by the AQMD under source specific NO_x rules. However, there is a wide variety of combustion equipment for which the AQMD does not have source specific NO_x rules. The equipment includes but is not limited to ovens, dryers, furnaces, kilns, afterburners and incinerators. The equipment is used in many industrial and commercial operations to dry, bake, cure, melt, burn off and form materials, or as VOC control devices.

Ovens, dryers and furnaces at non-RECLAIM facilities have NO_x emission limits based on BACT/LAER requirements at the time the equipment was permitted. In addition, equipment exempt from permit requirements are not subject to NO_x controls. However, technology is available to lower emissions from these units through retrofit of burners and controls or replacement with new equipment.

Regulatory History

In the 1994 and 1997 AQMP, control measure CMB-02 included reductions from a variety of non-RECLAIM combustion sources. Of the six components of the control measure, two have been implemented as AQMD rules (CMB-02B – Small Boilers and Process Heaters and CMB-02F – IC Engines). The other components of CMB-02 proposed reductions from curing and drying ovens, metal melting furnaces, afterburners, and other miscellaneous combustion sources.

In the 2003 AQMP these components of the control measure were delayed due to administrative and technical issues. These categories are being reconsidered because technology has advanced and is more cost effective.

PROPOSED METHOD OF CONTROL

NO_x emissions from these types of equipment can be reduced using low NO_x burners. Many different types of burners have been developed to reduce NO_x emissions from combustion sources. The principle technique involves premixing of fuel and air before combustion takes place. This results in a lower peak and more uniform flame temperature. A lower flame temperature reduces formation of NO_x. Some premix burners also use staged combustion with a fuel rich zone to start combustion and stabilize the flame and a fuel lean zone to complete combustion and reduce the peak flame temperature.

Burners can also be designed to spread flames over a larger area to reduce hot spots and lower NO_x emissions. Radiant premix burners with ceramic, sintered metal or metal fiber flame surfaces spread the flame, lower NO_x emissions and produce more radiant heat. When a burner produces more radiant heat, it can also result in less heat escaping the equipment through exhaust gasses and an increase in efficiency.

Low NO_x burners can significantly reduce emissions. Uncontrolled gas-fired ovens and dryers typically have NO_x emissions on the order of 120 ppm. Ovens and dryers subject to BACT/LAER can have emission limits ranging from 60 ppm to less than 20 ppm. Uncontrolled high temperature furnaces and ovens can have NO_x emissions greater than 150 ppm. High temperature furnaces that meet BACT/LAER can achieve NO_x emissions as low as 60 ppm.

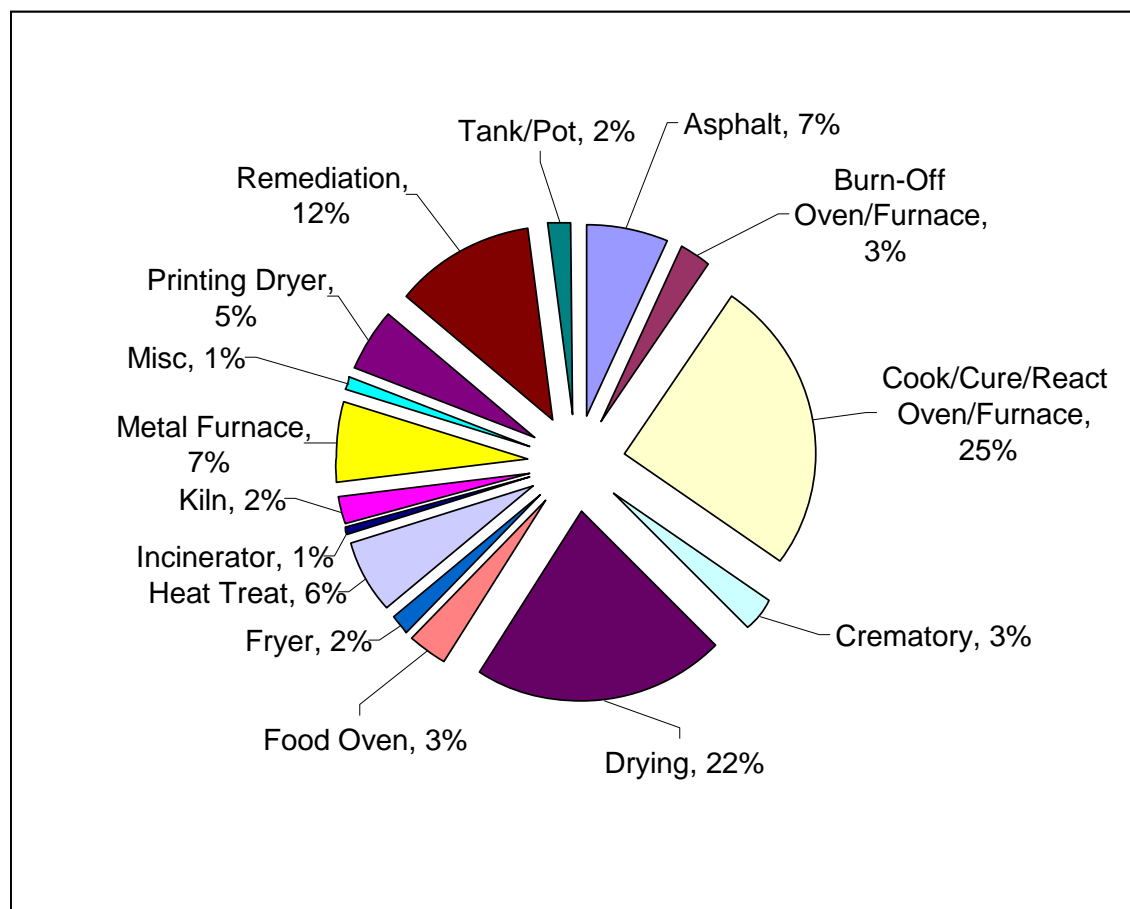
During the rulemaking process it may be assessed that reducing NO_x emissions from this category is better suited by applying today's BACT as described in the 2007 AQMP control measure MCS-01 Facility Modernization.

EMISSIONS REDUCTION

The current inventory for permitted equipment in these categories is estimated to be approximately TBD tons of NO_x per day. Approximately 25 to 35% of this equipment is estimated to be permitted at current BACT. An estimate of the percent emissions associated with major categories of this type equipment is presented in Figure 1 based on District permit database. Reductions of 50 to 75% are achievable for the equipment which has not been subject to BACT. The estimated NO_x emission reduction from requiring current BACT is therefore about 50 percent. It is anticipated that 3.7 tons per day of NO_x emission reductions could be achieved by 2014 and 4.0 tons per day by 2020.

Additional reductions can be achieved by adopting emission limits for new ovens, dryers and furnaces that do not require a permit. These reductions can be achieved by requiring new equipment to be certified at lower emission levels as is required for small boilers and heaters subject to AQMD Rule 1146.2.

Figure 1 – NOx Emission Contribution of NOx Non-RECLAIM Equipment Categories



RULE COMPLIANCE AND TEST METHODS

Compliance with the provisions of this control measure would be based on source testing, permit requirements, monitoring, recordkeeping, and reporting requirements similar to those in other AQMD rules regulating combustion sources. In addition, compliance would be verified through inspections.

COST EFFECTIVENESS

The cost effectiveness of retrofitting this type of equipment to meet best available retrofit control technology (BARCT) was analyzed for the January 2005 amendment to the NOx RECLAIM program. The cost effectiveness in that analysis varied from about \$4,000 per ton of NOx reduced to \$13,000 per ton. The typical cost effectiveness was around \$10,000 per ton NOx reduced. This cost effectiveness is also within the range of cost effectiveness in the January 2005 amendment for RECLAIM boilers and process heaters to meet BARCT. It is also in the range of cost effectiveness for small boilers and heaters to meet 20 ppm (Rule 1146.2). The cost effectiveness for this equipment to meet BARCT would be similar to these costs. In addition, in many cases, BACT and BARCT are the same.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from stationary sources.

REFERENCES

1994 AQMP Appendix IV-A

1997 AQMP Appendix IV-A

2003 AQMP Appendix IV-A

AQMD, Staff Report for Proposed Amended Rule 1121, December 1999.

AQMD, Staff Report for Proposed Amendments to Regulation XX - Regional Clean Air Incentives Market (RECLAIM), January 2005

AQMD, Staff Report for Proposed Amended Rule 1146.2, May 2006.

FURTHER SO_x REDUCTIONS FOR RECLAIM [SO_x]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:		SO _x RECLAIM FACILITIES	
CONTROL METHODS:		ALL AVAILABLE CONTROL METHODS	
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	2002	2014	2020
SO _x INVENTORY	11.66	11.73	11.76
SO _x REDUCTION		<u>3.0</u>	<u>3.0</u>
SO _x REMAINING		8.73	8.76
CONTROL COST:		TO BE DETERMINED	
IMPLEMENTING AGENCY:		AQMD	

DESCRIPTION OF SOURCE CATEGORY

As of the end of the 2004 compliance year, there were approximately 33 SO_x facilities in the Regional Clean Air Incentives Market (RECLAIM) Program. The RECLAIM program includes facilities with SO_x emissions greater than or equal to four tons per year in 1990 or any subsequent year. SO_x facilities in the RECLAIM program have a wide range of equipment such as Fluidized Catalytic Cracking Units (FCCU), furnaces, internal combustion engines, boilers, incinerators, dryers, kilns, afterburners, heaters, and gas turbines.

This control measure identifies a series of control approaches that would be implemented as part of Best Available Retrofit Control Technology (BARCT) for the SO_x RECLAIM program. Depending on the control strategy implemented, this control measure may affect all SO_x RECLAIM facilities or a portion of the facilities based on their annual emissions or the type of equipment at the facility.

Background

Under the RECLAIM program, facilities are issued SO_x (and NO_x) allocations. SO_x allocations decline annually until 2003, and remain constant thereafter. To meet their annual allocation, facilities have the option of installing pollution control equipment, changing operations, or purchasing RECLAIM Trading Credits (RTCs).

Additional emission reductions from RECLAIM may be needed to meet the federal “as expeditiously as practicable” and the state “all feasible measures” requirements. When the RECLAIM program was adopted, it was designed to achieve a Best Available Retrofit Control Technology (BARCT) level of emission reductions. As BARCT is updated to reflect

improvements in pollution control equipment, additional reductions from the RECLAIM program may be possible.

Regulatory History

On October 15, 1993, the AQMD's Governing Board adopted the RECLAIM program. Regulation XX – RECLAIM includes 11 rules that specify the applicability, allocations, definitions, requirements, and monitoring, reporting, and recordkeeping requirements. When the RECLAIM program was adopted, it originally included 41 SO_x and 392 NO_x commercial and industrial facilities. Since the adoption of RECLAIM, there have been a number of amendments to the RECLAIM rules.

The California Clean Air Act (CCAA) requires districts to achieve and maintain state standards by the earliest practicable date and for extreme non-attainment areas, to include all feasible measures Health and Safety (H&S) Code (H&S §§40913, 40914, and 40920.5). The term “feasible” is defined in the 14 California Code of Regulations, section 15364, as a measure “capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.” The required use of BARCT for existing stationary sources is one of the specified feasible measures. H&S Code §40440 (b)(1) requires AQMD to adopt rules requiring best available retrofit control technology for existing sources. H&S Code §40406 specifically defines BARCT as “...best available retrofit technology means an emission limitation that is based on the maximum degree of reduction achievable taking into account environmental, energy, and economic impacts by each class or category of source.”

In RECLAIM, these emission limits are converted into mass emission limitations utilizing activity levels. BARCT for each category of equipment takes into account the range of types and size of equipment in each category.

Applicable RECLAIM Task Force recommendations would be incorporated during the rulemaking process.

PROPOSED METHOD OF CONTROL

There are a variety of approaches that can be implemented to achieve additional emission reductions from the RECLAIM program. The following identifies four types of approaches that can be used individually or collectively. The type of approach selected and the extent that the approach is implemented will depend on a number of factors that include, but are not limited to:

- Technical feasibility of control option(s);
- Cost-effectiveness of the control option(s);
- Growth demand to accommodate new sources;
- Equity between sources; and
- Implementation issues.

During the rulemaking process, it may be assessed that reducing SO_x emissions from this category is better suited by applying today's BACT as described in the 2007 AQMP Control Measure MCS-01 Facility Modernization.

Reduce Existing Ending Allocations

Under the RECLAIM program, initial SO_x allocations decline annually through the year 2003 and remain constant after 2003. This control option would seek further reductions in allocations from 2010 through 2014 and remain constant after 2014. Such reduction in allocations can be across-the-board shaving or source-specific. Similar to the existing RECLAIM program, facilities have the following options to meet their allocation: install pollution control equipment, process or other changes, or purchase RTCs.

EMISSIONS REDUCTION

Implementation of this measure is designed to achieve reductions from the following sources:

- 1) Rule 431.2 – Sulfur Content of Liquid Fuels specifies the sulfur content in stationary diesel combustion to be 15 ppm beginning in 2004;
- 2) BACT achieved in the past due to Rule 2015 – Backstop Provisions; and
- 3) Any BARCT not yet incorporated in the ending allocation.

It is estimated at this time that 3 tons per day of SO_x reductions by 2014 could be available with a linear declining balance between 2010 and 2014. Staff will continue to refine our estimates in the next several months.

RULE COMPLIANCE AND TEST METHODS

Compliance with the provisions of this control measure would be based on monitoring, recordkeeping, and reporting requirements that have been established in either the RECLAIM program or existing source specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not yet been determined

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from stationary sources.

FURTHER NOX REDUCTIONS FROM SPACE HEATERS [NO_x]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:		NATURAL GAS FIRED FAN-TYPE FURNACES	
CONTROL METHODS:		LOW NOX BURNERS	
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	2002	2014	2020
NOX INVENTORY	9.7	10.5	11.0
NOX REDUCTION		<u>1.0</u>	<u>3.2</u>
NOX REMAINING		9.5	7.8
SUMMER PLANNING INVENTORY	2002	2014	2020
NOX INVENTORY	3.4	3.6	3.8
NOX REDUCTION		<u>0.4</u>	<u>1.1</u>
NOX REMAINING		3.3	2.7
CONTROL COST:		\$10,000 PER TON NO _x REDUCED	
IMPLEMENTING AGENCY:		AQMD	

DESCRIPTION OF SOURCE CATEGORY

Background

Natural gas fired fan-type central furnaces are used in residential and commercial buildings to provide comfort heating. Most single family homes and many multiunit residences in the South Coast Air Quality Management District (District) have this type of heating equipment. Many older homes, with below floor furnaces, have been retrofitted with this type of forced air heaters. Typically, residential units have burners rated between 50,000 and 175,000 British thermal units per hour (Btu/hr). Since 1984, this equipment has been regulated by the District Rule 1111 – NO_x Emissions from Natural Gas-Fired, Fan type Central Furnaces.

Regulatory History

Rule 1111 was first adopted by the District Governing Board in December 1978 and amended in July 1983. The rule regulates natural gas fired fan-type central furnaces with an input rate of less than 175,000 Btu/hr. The NO_x emission limit in the rule is 40 nanograms/joule (ng/J) of heat delivered to the heated space (heat output). As required by Rule 1111, the manufacturer must obtain certification of each furnace model based on source testing conducted in accordance with the test methods approved by the District.

PROPOSED METHOD OF CONTROL

NO_x emissions from these types of equipment can be controlled with low NO_x burners. Other combustion equipment with similarly sized burners can achieve NO_x levels as low as 15 to 20

ppm (10 to 14 ng/J). The current Rule 1111 requires natural gas fired fan-type central furnaces to meet a NO_x emission limit of 40 ng/J heat output. Also, this is the current NO_x emission limit under the District Rule 1146.2 (Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters) for boilers and water heaters rated up to 400,000 Btu/hr. The future limit for these small boilers in the year 2012 is 20 ppm or 14 ng/J heat output. The current limit for residential tank-type water heaters rated less than 75,000 Btu/hr per Rule 1121 (Control of Nitrogen Oxides from Residential Type, Natural Gas-Fired water Heaters) is 15 ppm or 10 ng/J heat output.

To achieve NO_x emission levels of 30 ppm (20 ng/J) or less from the central furnaces will likely require the use of power premix burners in the higher heat input range, and atmospheric premix burners in the lower heat input range.

Another control strategy available for NO_x reduction is the use of heat pumps for space heating which do not burn natural gas, and are often used in moderate climates. This technology may be promoted through an incentive program or by regulation.

EMISSIONS REDUCTION

Technology exists to achieve NO_x emission levels of 15 to 30 ppm (10 to 20 ng/J) from burners in this size range. The current emission limit is 40 ng/J; emission reductions of 50% to 75% are possible from this source category. It is anticipated that this emission limit will be implemented by 2011. Assuming a 65% reduction (from 40 to 14 ng/J), a reduction of 3.2 tons/day NO_x emissions could be achieved by the year 2020 from the baseline year 2002 annual average inventory of 9.7 tons/day .

RULE COMPLIANCE AND TEST METHODS

Manufacturers are responsible for ensuring that the equipment meets the emission limit. Compliance is determined by testing each appliance model using test methods and procedures approved by the District. Test results are reviewed for approval by the District.

COST EFFECTIVENESS

At the present time, there are no heating furnaces with NO_x emissions significantly below the 40 ng/J standard in the District Rule 1111. A review of the emissions test data for Rule 1111 compliance indicates that typical emissions range from 30 to 40 ng/J. However, cost effectiveness analyses have been performed for similarly sized burners (less than 175,000 BTU/hr) in other equipment regulated by the District.

Based on the cost effectiveness of power premixed burners to reduce emissions from 40 ng/J to 20 ng/J in small boilers and water heaters (100,000 to 300,000 Btu/hr), subject to the District Rule 1146.2, the cost effectiveness of meeting 20 ng/J or 30 ppm for this control measure is estimated to be up to \$12,500 per ton of NO_x reduced. The cost effectiveness to meet 14 ng/J (20 ppm) for the same units was estimated to be up to \$10,000 per ton of NO_x reduced. In a similar analysis for the District Rule 1121, the cost effectiveness to reduce NO_x emissions from 40 ng/J to 10 ng/J for premixed atmospheric radiant burners, in the size range of 30,000 to

50,000 Btu/hr used in residential tank-type water heaters, was estimated to be \$16,000 per ton of NO_x reduced.

The cost effectiveness for fan-type central furnaces should be lower than for small boilers and water heaters since the expected life of a central furnace is more than for tank-type water heaters and small boilers. More emission reductions would be achieved for the same cost. Most manufacturers provide a 20 year warranty on the heat exchanger of the furnace. In the cost effectiveness analyses for Rule 1146.2, the lifetime of small boilers was assumed to be 15 years. A tank type water heater has a shorter lifetime of 10 years.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from stationary sources.

REFERENCES

SCAQMD, Staff Report for Proposed Amended Rule 1121, December 1999.

SCAQMD, 2003 AQMP Appendix III, Base and Future Year Emissions Inventories, August 2003.

SCAQMD, Staff Report for Proposed Amended Rule 1146.2, May 2006.

CEC (California Energy Commission), California Statewide Residential Appliance Saturation Study, June 2004.

NATURAL GAS FUEL SPECIFICATIONS [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY:	NATURAL GAS FUEL COMBUSTION (STATIONARY SOURCES)
CONTROL METHODS:	FUEL SPECIFICATIONS
EMISSIONS (TONS/DAY):	NOT DETERMINED
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	SCAQMD

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to minimize potential future emission increases from the combustion of natural gas in stationary applications.

Background

Natural gas is a combustible, gaseous mixture composed primarily of methane (CH₄), with lesser amounts of ethane (C₂H₆), propane (C₃H₈), butane (C₄H₁₀) and pentane (C₅H₁₂), oxygen and inert compounds such as carbon dioxide and nitrogen. The table below compares the natural gas characteristics of the current system average for Southern California Gas Company (SoCalGas), California-produced natural gas, and current LNGs supplies that may be imported in the future.

	System Average	California Production*	Potential LNG Imports
Higher Heating Value, (Btu./scf)	1020	1007-1150	1063-1166
Wobbe Index, (Btu/scf)	1332	1283-1431	1373-1446
Carbon Dioxide, (% by Volume)	1.25%	0.09-3.00%	Trace
Air (N ₂ , O ₂), (% by Volume)	0.7%	0.12-3.15%	Trace
Total Inerts, (% by Volume)	1.95%	0.34-4.00%	Trace
Methane, (% by Volume)	95.4%	84-99%	83.2-91.2%
Ethane, (% by Volume)	2.1%	0.13-10%	4.3-13.2%
Propane, (% by Volume)	0.5%	0.02-7.1%	2.2-5.0%
Hexane, (% by Volume)	Trace	Trace -.48%	Trace

* Acceptable under Rule 30 to be injected into SoCalGas distribution system

The natural gas currently supplied to AQMD and San Diego County is close to the System Average in the chart, with a typical 95% methane, 1020 Btu/scf higher heating value (HHV) and 1332 Btu/scf Wobbe Index (WI). In counties north of AQMD, where local gas production is significant, the average gas has a higher HHV and WI than in AQMD. SoCalGas Rule 30 would

allow the mixing of local gases with a HHV up to 1150 Btu/scf and a WI up to 1431 Btu/scf into their distribution system.

The increasing demand for natural gas indicates that there is a need for importation of Liquefied Natural Gas (LNG) from foreign countries. One LNG terminal is under construction in Baja California, and several more are proposed, that will bring LNG to Southern. Introducing LNG which contains higher concentrations of heavier hydrocarbon components into the distribution system will result in a different mixture of gas quality than traditional supplies. The change in gas quality will directly affect air quality and performance of the machinery and end-user appliances. The effect would depend on the type of burner and how the device was tuned to its previous gas supply. Studies have shown that some combustion devices are relatively insensitive to changes in gas quality, while others can have increased NO_x, CO and soot emissions. Sensitive devices include appliances with closed combustion chambers (i.e. ovens), low-NO_x boilers with lean premix burners, microturbines, lean-burn natural gas engines, and large gas turbines with dry low-NO_x combustors. Sensitive devices can have NO_x emission increases from 20 to over 100% with hot gas. Appropriate tuning may reduce the emissions increase.

The Natural Gas Council's Interchangeability Work Group's white paper provides a good discussion of natural gas interchangeability, and identifies the needed research to address the unknowns with gas quality, particularly with industrial combustion equipment where little testing has been done. It found that WI was an effective screening tool for interchangeability, but alone is not sufficient to adequately predict all combustion phenomena. As an interim approach, it recommends that new gas supplies should not exceed the local historical average WI by more than $\pm 4.0\%$ and a maximum WI of 1400 Btu/scf, maximum HHV of 1100 Btu/scf, and maximum gas composition limits of 1.5% butane+ and 4% total inerts.

Regulatory History

California Public Utilities Commission (PUC) General Order 58-has standards for the hydrogen sulfide and total sulfide content of gas (0.25 grain/100 scf and 5 grains/100 scf, respectively) but does not contain standards for HHV or WI

SoCalGas's Tariff Rule 30 applies only to "customer-owned gas" and has gas quality specifications for HHV, WI, moisture content, hydrogen sulphide, mercaptan sulfur, total sulfur, carbon dioxide, oxygen, inerts, and hydrocarbons and other properties. It allows a wide range of HHV (970-1150 Btu/scf) and a wide range of WI (± 10).

Since 2004, under the order of the Federal Energy Regulatory Commission (FERC), the PUC has initiated a Rulemaking 04-01-025 to address the sufficiency of natural gas supplies and infrastructure in California. In a Phase 2 proceeding of Rulemaking 04-01-025, SoCalGas proposed to limit the WI to a range of 1290 to 1400 Btu/scf, and AQMD recommended a maximum WI for new large gas supplies of $1332 \pm 2\%$, or 1360 Btu/scf in order to reduce emission impacts. The PUC issued a proposed decision and an alternate proposed decision, and adopted the alternate proposed decision in September 2006. In general, the PUC directs SoCalGas to file a revised Rule 30 tariffs that contain the following specification: minimum WI

of 1279 Btu/scf, maximum WI of 1385 Btu/scf, minimum HHV of 990 Btu/scf, maximum HHV of 1150 Btu/scf, maximum carbon dioxide content of 2%, and maximum oxygen content of 0.1%. The PUC also directs SoCalGas to post real-time information on the WI of gas at identified points in the pipeline system on an electronic bulletin board.

District Rule 431.1 - Sulfur Content of Gaseous Fuels, limits the sulfur compound content of natural gas (calculated as hydrogen sulfide) to a maximum of 16 parts per million by volume. The District does not currently regulate the other properties of natural gas. The District has rules that regulate the emissions from combustion of natural gas from various types of equipment such as RECLAIM, Rule 1146, 1146.1, 1146.2, 1110.2, 1121 etc.

PROPOSED METHOD OF CONTROL

The control measure proposes to establish a maximum WI of 1360 Btu/scf for natural gas supplied to sources within the District's jurisdiction in order to maintain current gas quality. LNG suppliers could achieve the objective of this control strategy by 1) Importing a high-methane LNG, such as the 99+% methane gas proposed by BHP Billiton; 2) Removing the more complex hydrocarbons by condensing processes; or 3) Adding inert gases like nitrogen.

EMISSIONS REDUCTION

Projected emission reductions are uncertain at this time, and require further analysis. The control measure may only reduce future emission increases rather than provide emission reductions.

SoCalGas estimated that importing 1.0 bcf/day of CNG could increase NO_x emissions in AQMD by 1.2 tons per day. There are not adequate data to support this estimate. The increase could be higher because 1) studies underway and sponsored by the California Energy Commission at the Gas Technology Institute may find that there are emission imports from natural gas used by industrial burners; 2) imported LNG could potentially replace all of the current low-WI interstate gas; 3) only a small number of units were tested in each equipment category by the SoCalGas test program; 4) the SoCalGas analysis assumed all industrial equipment would be readjusted to hotter gas and ignored the effects of frequent changes in gas quality.

RULE COMPLIANCE

Compliance with this control measure would depend on the type of controls implemented.

TEST METHODS

The appropriate testing methods are uncertain at this time and would require further analysis.

COST EFFECTIVENESS

Not Determined

IMPLEMENTING AGENCY

AQMD has the authority to adopt and enforce rules and regulations to achieve and maintain the state and federal ambient air quality standards in all areas affected by emission sources under its jurisdiction (Health and Safety Code §40001), and may need to seek additional legislation to implement this control measure.

REFERENCES

California Public Utilities Commission, General Order 58-A: Standards for Gas Service in the State of California, April 1989.

California Public Utilities Commission, Phase 2 of Rule 04-01-025, Proposed Decision of Administrative Law Judges' Ruling on Rule 04-01-025 Phase 2 Order Addressing Infrastructure Adequacy & Slack Capacity, Interconnection & Operational Balancing Agreements, An Infrastructure Working Group, Natural Gas Supply and Infrastructure Adequacy For Electric Generators, Natural Gas Quality and Other Matters, August 8, 2006.

Natural Gas Council Interchangeability Work Group, "White Paper on Natural Gas Interchangeability and Non-Combustion End Use", February 28, 2005

SCAQMD, "Effects of Hot Gas on Stationary Source Emissions," Presentation to CAPCOA Mobile Source and Fuels Subcommittee, January 2003.

Southern California Gas Company, "Final Report – Gas Quality and Liquefied Natural Gas Research Study", April 2005

Southern California Gas Company, CPUC Rule 30, Transportation of Customer-Owned Gas, 1998-2003.

Responsive Testimony of South Coast Air Quality Management District to Testimony and Proposal of San Diego Gas and Electric Company and Southern California Gas Company, Barry Wallerstein, CPUC Case R.04-01-025, September 23, 2005.

Opening Brief of South Coast Air Quality Management District, CPUC Case R.04-01-025, January 18, 2006.

Proposed Rebuttal Testimony of Joseph Hower, San Diego Gas & Electric Company and Southern California Gas Company, CPUC Case R.04-01-025, November 30, 2005.

GROUP 4

PM Sources

**PM CONTROL DEVICES (BAGHOUSES, WET SCRUBBERS,
ELECTROSTATIC PRECIPITATORS, AND OTHER DEVICES)
[PM]**

CONTROL MEASURE SUMMARY

SOURCE CATEGORY:	PM CONTROL DEVICES
CONTROL METHODS:	FABRIC OR OTHER FILTRATION DEVICES
EMISSIONS (TONS/DAY):	NOT DETERMINED
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

Baghouses are air pollution control devices that filter out small particles on the surface of fabric bags in a contained unit. This measure would strengthen existing regulatory requirements for baghouses to improve overall control efficiency by establishing stricter emission standards, automatic monitoring systems to ensure proper operation, and standard operating and maintenance procedures. Where applicable, other control devices designed to control PM emission, including wet scrubbers and electric precipitators could be implemented

Background

AQMD rules establish particulate matter emissions limits and visible opacity standards that may be achieved with baghouse control equipment. Baghouses are considered by the AQMD as the Best Available Control Technology (BACT) to effectively reduce particulate emissions. Currently two AQMD rules require baghouses to be equipped with automatic leak detection systems; Rule 1156 - *PM10 Emission Reductions from Cement Manufacturing Facilities*, and Rule 1407 – *Control of Emissions of Arsenic, Cadmium, and Nickel and Non-ferrous Metal Melting Operations*. This measure would expand the requirement for Bag Leak Detection Systems to new and amended rules that rely on baghouses as particulate matter control devices. Electric precipitators or wet scrubbers might also be employed to reduce PM emissions from various operations.

Regulatory History

Historically, for almost 20 years (1988), baghouses have been designated BACT for controlling PM. Retrofit technology has advanced making high control efficiency possible. These improved retrofit requirements have begun to be implemented in AQMD rules. For example, in the rule development process for Rule 1156, AQMD staff received several comments from the public and baghouse vendors regarding the monitoring requirements for baghouses. Baghouse manufacturers strongly recommended that AQMD include a requirement for Bag Leak Detection Systems that would benefit the industry by allowing equipment operators to predict and detect bag failure before it occurs. Specifically, recommendations were made to include operation and maintenance procedures for baghouses to ensure that the performance of the baghouse is verified when the equipment is tested and maintained continuously. These procedures contain technical requirements required by the U.S.

EPA's Maximum Achievable Control Technology (MACT) for National Emission Standards for Hazardous Air Pollutants (NESHAPS) for the Portland Cement Manufacturing Industry (40 CFR Part 63, Subpart LLL, §63.1350). The NESHAPS implement the federal Clean Air Act by requiring all major sources to meet emission standards for hazardous air pollutants reflecting application of the MACT. Rule 1156 also has required O&M procedures and incentivizes the use of EPA verified filtration products by less frequent source testing and record keeping requirements.

PROPOSED METHOD OF CONTROL

Description of Control Opportunities

- Specify opacity standards for PM control devices (e.g., 20%)
- Specify PM emission standards for PM control devices based on outlet concentrations (e.g., 0.01 gr/dscf PM for existing control equipment and 0.005 gr/dscf for new control equipment).
- Require enclosure of process equipment (i.e., aggregate processing) and conveyors.
- Require use of EPA-approved high-efficiency baghouse filters.
- Specify performance standards for ventilation and hood systems
- Require operators of PM control devices to monitor, record and report (MRR) pertinent operating parameters of the air pollution control device to ensure continuous compliance with the emission standards, and install and operate Continuous Opacity Monitor System (COMS) or Bag Leak Detection System (BLDS) for top process emitters
- Require operators of PM control devices to establish operating and maintenance procedures, coupled with regular source testing to ensure proper equipment operation.

EMISSIONS REDUCTION

An additional 30 to 50 percent emission reductions are feasible for existing equipment/processes equipped with PM control devices using the above noted control techniques and operating practice standards. Properly operated and maintained baghouses are extremely efficient air pollution control devices, but they may be very ineffective if dust cake is allowed to accumulate on the surface of the bags or the fabric is torn. This measure seeks to improve the operation and maintenance of baghouses by requiring an automated alarm system (COMS or BLDS) to be installed to minimize the release of excess particulate matter during upset conditions that follow equipment malfunction or failure. In the event the alarm is triggered, corrective action procedures could include a shutdown of the process producing the particulate emissions or a specific section of the baghouse itself, depending on its size. Corrective actions may be more stringent for baghouses controlling toxic particulate matter emissions. This is the benefit of requiring established operating and maintenance procedures.

RULE COMPLIANCE

Develop a new rule with a schedule of compliance based on size rating. Require retrofitting for existing PM sources (BARCT) and control new equipment based on outlet concentrations. Compliance with this measure would be based on monitoring, recordkeeping and reporting requirements established in other District rules (e.g., Rule 1156) and would take into account a schedule of compliance based on size rating and outlet concentration, etc.

TEST METHODS

BLDS or COMS would be required as indicators of fabric filter performance. The equipment operator should follow EPA's *Fabric Filter Bag Leak Detection Guidance*, and *Industrial Ventilation Handbook*, for proper set up procedures, system operation principles, and quality assurance. In addition, EPA has verified filtration products that have demonstrated high performance under specific operational conditions.

COST EFFECTIVENESS

The cost of a typically BLDS ranges from about \$5,000 to \$9,000. The system cost will approach \$6,000 to \$12,000 if it is equipped with a data logger. COMS will range from \$20,000 to \$25,000 per monitor. Manufacturers indicate the initial costs may be quickly recovered within a year or two because the system reduces employee-related costs associated with equipment monitoring, and the fact that overall equipment performance is improved which may double the life of fabric bags.

- High efficiency filter bags can cost upwards of twice that of conventional bags.
- The cost of source tests can vary, but typically cost \$3,000 to \$5,000, but can cost more depending on the complexity of the equipment or process.
- Covered or enclosed conveyors can cost from \$100 to \$1,000 per foot.

IMPLEMENTING AGENCY

The District has the authority to implement this measure.

REFERENCES

Rule 1156 final staff report November 2005.

PM EMISSION HOT SPOTS – LOCALIZED CONTROL PROGRAMS [PM]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY:	PM HOT SPOTS
CONTROL METHODS:	ALL PM REDUCTION METHODS FEASIBLE
EMISSIONS (TONS/DAY):	NOT DETERMINED
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

The Basin covers a large geographic territory. The natural consequence of its size is that not all areas of the Basin are at the same stage of economic development. Locations with economic development as a result of increased construction activity may be prone to significantly higher levels of particulate matter as compared to the broader surrounding area. For example, the highest levels of PM10 concentrations are measured at the AQMD's monitoring station in Rubidoux, which is currently undergoing a significant redevelopment effort.

Background

The AQMD has not attained the annual average federal PM10 and PM2.5 standards. U.S. EPA revoked the annual federal PM10 standard on September 21, 2006. However, to ensure progress toward PM2.5 standards (a subset of PM10) and to address community PM exposure, this measure will continue to be pursued. While the District has made great progress in reducing PM concentrations Basinwide, certain areas have been proven to be more challenging than others in achieving the necessary reductions of PM concentrations that are deemed as PM "Hot Spots". One such area is Rubidoux in Riverside County which is the only area out of attainment for the federal PM10 standard. Primary contributors to those high levels, which currently exceed federally established threshold levels, are sources of crustal material (better known as entrained fugitive dust). In and around the area of the Rubidoux monitoring station are unstabilized vacant lots, many roads have unimproved road shoulders and are thereby not subject to street sweeping, and some roads and residential parking areas are unpaved. This control measure would establish a localized program to supplement the regional approach to address PM hot spots through a cooperative effort with local agencies to reduce emissions from direct sources of PM. Sources of funding will be sought to aid in achieving the reductions, particularly for residents and private property owners. Any success and lessons learned in addressing the high PM10 emissions in the Rubidoux area will be used in addressing any PM10 hot spots in other areas of the Basin.

Regulatory History

The AQMD has enacted a number of rules to address the issue of PM emissions for the past 30 years. In addition to developing and implementing programs to reduce fugitive dust from a variety of different sources, recently, measures have been taken to address the PM emissions associated with diesel emissions. Overall, the difficulty in attaining the PM standards may be attributed to the geographical nature of the Basin with PM emissions coming not just from combustion sources and other anthropogenic activities but also the ocean spray and desert environment that are part of Southern California and can be complicated by the fact that certain areas undergoing significant economic development are subject to higher particulate emissions due to the increased construction activity. The AQMD has examined and implemented localized programs, such as the Ports initiatives and railroad rules to address localized PM “Hot Spots”.

PROPOSED METHOD OF CONTROL

In the case of fugitive dust, control opportunities could include one or more of the following:

- Require fencing to inhibit dumping, and require mowing for weed abatement, pursuant to Rule 403 to create stabilized surfaces that minimize wind-blown dust;
- Clean-out existing curbs and implement street-sweeping; and
- Encourage residents with dirt driveways to cover them with gravel or otherwise stabilize the surface.

Implementation of these measures could be executed through cooperative efforts, wherein AQMD and local governments would work together each under their own authority to maximize dust control efforts. In addition, this measure would enhance AQMD’s enforcement presence to ensure compliance with air quality requirements and support Off-highway Vehicle (OHV) ordinance enforcement. Also, the AQMD would work with economic development agencies to expedite construction activities directly affecting fugitive dust sources, including paving of roads and parking areas, curb/gutter and sidewalk installation where needed, and where not feasible for sidewalks, install landscaping.

Areas where combustion sources are the major contributors might reduce emissions through implementation of the Control Measure for PM Control Devices (Baghouses/wet scrubbers/electrostatic precipitators). The Goods Movement in Port Plan is an example of addressing a PM Hots Spots through the implementation of a variety of coordinated efforts.

EMISSIONS REDUCTION

Not Determined.

RULE COMPLIANCE

To Be Determined

COST EFFECTIVENESS

The cost-effectiveness of this control measure has not yet been determined. The District will continue to analyze the potential cost impacts associated with implementing this control measure and will provide specific cost-effectiveness as it becomes available.

IMPLEMENTING AGENCY

The District has authority to implement this measure.

EMISSION REDUCTIONS FROM WOOD BURNING FIREPLACES AND WOOD STOVES [PM]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	RESIDENTIAL WOOD COMBUSTION		
CONTROL METHODS:	LOW EMISSION STANDARDS, INCENTIVE PROGRAMS, SMOKE MANAGEMENT PLAN (VOLUNTARY CURTAILMENT), AND PUBLIC OUTREACH		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	2002	2014	2020
PM INVENTORY	6.0	6.7	7.1
PM REDUCTION		<u>0.7</u>	<u>0.7</u>
PM REMAINING		6.0	6.4
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to seek emission reductions from wood burning fireplaces and wood stoves.

Background

The types of devices used to burn wood in a typical residence are fireplaces and wood heaters which include fireplace inserts and free-standing wood stoves. Since fireplaces are very inefficient heat sources, they are used primarily for aesthetic effects. Fireplace inserts and wood stoves are much more efficient and in some residences are used as the primary source of heating.

Equipment Description

(The following discussion of wood burning devices is taken directly from U.S. EPA AP-42, Sections 1.9 and 1.10, October 1996.)

Fireplaces can be divided into two broad categories: (1) masonry (generally brick and/or stone, assembled on site, and integral to a structure) and (2) prefabricated (usually metal, installed on site as a package with appropriate duct work). Some prefabricated fireplaces can be inserted into existing masonry fireplace openings, and thus are called “inserts”.

Wood stoves are enclosed wood heaters that control burning or burn time by restricting the amount of air that can be used for combustion. They are used both as the primary source of residential heat and to supplement conventional heating systems. Based on known variations in construction, combustion, and emission characteristics, there are five different categories of residential wood heating devices: (1) the conventional wood stove; (2) the non-catalytic wood stove; (3) the catalytic wood stove; (4) the pellet stove; and (5) the masonry heater.

Emissions

Emissions from residential wood burning devices, caused primarily by incomplete combustion, include PM, CO, NO_x, SO_x, and VOC, although particulate emissions have been the focus of other air district control programs. Studies indicate that the majority of particulate emissions from residential wood burning are in the fine fraction (2.5 micrometers or less). Additionally, incomplete combustion of wood produces polycyclic organic matter, a group of compounds classified as hazardous air pollutants under Title III of the federal Clean Air Act.

The emissions inventory from residential wood burning in the District is presented in the control measure summary. The emissions inventory was developed based on the estimated number of wood-burning households and the amount of wood burned per household by county, and U.S. EPA's AP-42 emission factors. AQMD staff, in cooperation with CARB and other stakeholders, has been reevaluating the emissions inventory in conjunction with current rule development efforts.

REGULATORY HISTORY

Prior to the 2003 AQMP, the District had not developed a control measure for residential wood burning for rule development. The U.S. EPA and CARB regulations of this source are discussed below.

In 1988, the U.S. EPA promulgated New Source Performance Standards for new wood heaters (i.e., wood stoves and fireplace inserts) to reduce PM emissions. Since then, the U.S. EPA has regulated the manufacture and sale of new wood heaters in the U.S. with standards becoming effective in 1990. Phase I of the regulation required that after July 1, 1990, catalytic wood heaters must be certified to meet 5.5 grams per hour particulate matter emission standard and non-catalytic wood heaters must meet a 8.5 grams per hour standard. Phase II requires that new wood heaters sold after July 1, 1992 must meet more stringent standards of 4.1 grams per hour for catalytic heaters and 7.5 grams per hour for non-catalytic heaters.

There are no federal certification requirements for fireplaces. They are exempt from U.S. EPA certification because their air-to-fuel ratios are in excess of the 35:1. Only the states of Washington (WAC 150-31-200) and Colorado (Regulation 4) and the Northern Sonoma County Air Pollution Control District (APCD), San Luis Obispo County APCD, Shasta County Air Quality Management District and Great Basin Unified APCD (Regulation IV, Rule 504, Rule 3:23, and Rule 431, respectively) have fireplace standards. The California APCDs referenced above require all new wood burning devices (including fireplaces) installed in new or existing units to meet, at minimum, U.S. EPA Phase II emission standards. In effect, these regulations limit new residential wood burning devices to wood burning stoves, fireplace inserts, pellet-fueled wood heaters, or dedicated gas-fired fireplaces.

In 1989, the CARB adopted a suggested control measure (SCM) for emissions from residential wood heaters. CARB's SCM for the Control of Emissions from Residential Wood Combustion includes a list of specific control strategies for new and existing residential wood heaters (i.e., fireplace inserts and wood stoves – not fireplaces). CARB's SCM includes the following:

Public awareness programs: Retailers of wood heaters will be required to have available to customers, public information that includes pamphlets or other information discussing the proper operation and maintenance of wood heaters and health effects of wood smoke.

Replacement of existing wood heaters: Upon the sale of real property that contains a wood heater, the heater must be an EPA-certified, Oregon-certified, or pellet-fueled wood heater.

EPA Phase II requirements: This strategy will accelerate the implementation date by a year and a half, new wood heaters meeting EPA's Phase II requirements by January 1, 1991.

Sale of Used wood heaters: After January 1, 1991, used wood heaters that are offered for sale must be EPA-certified, Oregon-certified, or be pellet-fueled.

Moisture content of seasoned wood: Firewood that is offered for sale as "seasoned wood" must have a moisture content of 20 percent by weight or less.

Prohibited fuel types: Garbage, treated wood, plastic, rubber, waste petroleum products, paints and paint solvents, and coal having a sulfur content exceeding more than one percent by weight are prohibited from being burned in a residential wood-burning appliance.

Voluntary curtailment program: This program involves the voluntary curtailment of the use of wood heaters and fireplaces during poor air quality conditions.

As discussed above, a number of California air pollution control districts have adopted rules that regulate emissions from residential wood combustion. The requirements of these rules vary from voluntary programs to curtail burning on days with poor air quality to voluntary or mandatory installation of lower-emitting wood stoves to limiting or banning the installation of wood burning devices in new buildings. A sample of pertinent requirements from some of these air districts' rules is presented below.

- All solid fuel appliances (including fireplaces) must meet EPA Phase II certification. (Great Basin APCD)
- Mandatory wood burning curtailment when an Air Quality Index (AQI) over 150 is forecast. (San Joaquin Valley Unified APCD)
- Prior to the completion of the sale or transfer of any real property, all existing non-certified solid fuel appliances must be replaced, removed, or rendered permanently inoperable. (San Joaquin Valley Unified APCD)
- Installation of wood burning fireplaces is prohibited in new residential subdivisions with a density of greater than two dwelling units per acre. (San Joaquin Valley Unified APCD)

PROPOSED METHOD OF CONTROL

Fireplace and wood stove emissions are highly variable and are a function of wood characteristics and operating practices. In general, conditions which promote a fast burn rate and higher flame intensity enhance secondary combustion and thereby lower emissions. Studies performed by U.S. EPA have shown that new combustion device technology and non-conventional fuels (e.g., natural gas, manufactured logs, etc.) can considerably increase combustion efficiency and thereby significantly reduce emissions. Consequently, a technologically effective control strategy would ensure that all new wood combustion devices (i.e., including fireplaces) meet U.S. EPA certification standards (or other equivalent or more stringent standards¹) and would also accelerate the turnover of existing non-certified combustion units.

Based on a re-evaluation of the emissions inventory for wood burning devices as well as the feasibility analysis of potential control strategies, a number of control strategies could be pursued including, but not limited to, those adopted by other air districts and those suggested by CARB. Sacramento Metropolitan Air Quality Management District (SMAQMD), for example, is currently in the rulemaking process to reduce emissions from wood burning appliances. The proposed SMAQMD regulation would consider the following potential strategies:

- Prohibit the installation of a new, permanently installed, indoor or outdoor, uncontrolled fireplace in new developments or existing homes;
- Prohibit the sale, installation, or transfer of any non-U.S. EPA Phase II certified wood burning appliance;
- Require proper operation of U.S. EPA Phase II certified wood burning appliances;
- Require distribution of wood burning educational information at the point of sale of wood burning appliances;
- Require wood advertised as seasoned or dry to contain 20% moisture or less;
- Prohibit burning of garbage or other items not intended for use as fuel (Sacramento Metropolitan AQMD, 2006); and

EMISSIONS REDUCTION

Emission reductions associated with this control measure would depend on amendments to the existing emissions inventory and the control strategy pursued. For reference, the recently proposed wood smoke control program for the Sacramento area estimated a five percent reduction in residential wood burning PM emissions (Sacramento Metropolitan AQMD, 2006).

A 20 percent reduction of PM emissions was estimated for the adopted San Joaquin Valley

¹ More stringent standards may include thermal efficiency standards. Increased thermal efficiency likely reduces emissions since less fuel is consumed to produce the same amount of heat. There has been little incentive for manufacturers to increase thermal efficiency since efficiency testing is not required in the U.S. EPA New Source Performance Standard certification process.

wood smoke control program with the majority of emission reductions resulting from mandatory wood burning curtailment during periods of poor air quality (SJVUAPCD, 2003). It should also be noted that while controlling emission from residential wood burning is primarily intended to reduce particulate emissions, an added benefit would also be reduced emissions of CO, VOC, NO_x, SO_x, and hazardous air pollutants. This control measure seeks a minimum 10% reduction by 2014 based on all feasible measures as demonstrated by the regulatory requirements in Sacramento Metropolitan AQMD and San Joaquin Valley Unified APCD.

RULE COMPLIANCE

Compliance requirements for this control measure would depend on the control strategy implemented.

TEST METHODS

The appropriate test methods for this control measure would depend on the control strategy implemented.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not yet been determined. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide cost effectiveness information as it becomes available. Incremental costs to install a US EPA-certified Phase II wood burning appliance, a dedicated natural gas fireplace insert and an electric fireplace insert have been estimated at \$2,500, \$500, and \$400, respectively (Sacramento Metropolitan AQMD, 2006).

IMPLEMENTING AGENCY

The District has the authority to adopt and enforce rules and regulations to achieve and maintain the state and federal ambient air quality standards in all areas affected by emission sources under its jurisdiction (Health and Safety Code §40001). Specifically, the District has the authority to reduce or mitigate emissions from area sources such as residential wood burning devices (Health and Safety Code §40716).

REFERENCES

CARB, Section 7.1, Residential Wood Combustion, July, 1997.

CARB, Proposed Clean Air Plan (Rescinded), March 2002.

CARB, Agenda, Public Meeting to Consider Approval of a Suggested Control Measure for the Control of Emissions from Residential Wood Combustion, November 1989.

Great Basin Unified APCD, Rule 431 – Particulate Emissions – Town of Mammoth Lakes

Northern Sonoma APCD, Regulation IV - Control Measure for Wood Fired Appliance Emissions.

Sacramento Metropolitan AQMD, Draft Staff Report, Rule 417, Wood Burning Appliances, July 12, 2006.

San Joaquin Valley Unified APCD, Final Draft Staff Report, Amendments to Rule 4901 (Wood Burning Fireplaces and Wood Heaters), June 19, 2003.

U.S. EPA, AP-42, Section 1.9, Residential Fireplaces, October 1996.

U.S. EPA, AP-42, Section 1.10, Residential Wood Stoves, October 1996.

U.S. EPA, Residential Wood Combustion Technology Review - Volume 1. Technical Report, EPA-600/R-98-174a, December 1998.

ADDITIONAL PM EMISSION REDUCTIONS FROM RULE 444 – OPEN BURNING

[PM]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:		OPEN BURNING	
CONTROL METHODS:		PROHIBITION OF BURNS	
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	2002	2014	2020
PM10 INVENTORY	TBD	TBD	TBD
PM10 REDUCTION		TBD	TBD
PM10 REMAINING		TBD	TBD
CONTROL COST:		TO BE DETERMINED	
IMPLEMENTING AGENCY:		AQMD	

DESCRIPTION OF SOURCE CATEGORY

Rule 444 outlines the criteria and guidelines for agricultural and prescribed burning, as well as training burns to minimize PM emissions and smoke in a manner that is consistent with state and federal laws. Agricultural burning is open burning of vegetative materials produced from the growing and harvesting of crops, as well as fields preparation in agricultural operations. Prescribed burning is a planned open burning of vegetative materials, usually conducted by a fire protection agency and/or department of forestry, to promote a healthier habitat for plants and animals, and to prevent plant disease and pest, as well as fire episodes and destruction. Training burns are hands-on trainings conducted by fire protection agencies on methods of preventing and/or suppressing fire.

Background

Currently, Rule 444 allows open burning on permissive burn days, provided that permit and event authorization are obtained, and that such burning events are not prohibited by a fire protection agency. A permissive burn day is declared by the AQMD when certain meteorological conditions are met and the 1-hour ozone level does not exceed the state standard of 0.09 ppm. Rule 444 also includes general requirements (i.e., burning time window and ignition device) for open burning, as well as particular requirements, such as moisture level and firing methods for agricultural burning, and a Smoke Management Plan for prescribed burning. In addition, Rule 444 sets District-wide maximum daily burn acreage for agricultural and prescribed burning, but is lenient toward training burns if the duration is less than 30 minutes and clean fuel is utilized.

This control measure calls for potential administration and compliance streamlining of the burn program, as well as additional and/or alternative controls to further reduce PM emissions and smoke

from open burning. Alternatives to open burning are also required by state law for the San Joaquin Valley where agricultural burning will be phased out by the year 2010.

Regulatory History

Rule 444 – Open Burning, (previously Open Fires) was adopted October 1976. It has been amended three times, first in 1981. The rule was amended in 1987 to incorporate provisions of California Code of Regulations, Title 17 addressing wildland vegetative management burns. The rule was amended in 2001 to incorporate the Smoke Management Guideline requirement of the amended Title 17 and implement 1999 AQMP Control Measure WST-03.

PROPOSED METHOD OF CONTROL

Further PM emission reductions can be achieved through the following:

- Consideration of alternatives (i.e., chipping/grinding and/or composting) to agricultural burning, especially if the burn project is located within a close proximity to a sensitive receptor. Phase-out of agricultural burning, potentially by 2015, as all feasible measures pursuant to San Joaquin Valley APCD requirements..
- Establishment of a fee schedule and/or regulatory incentive program to limit agricultural burning and promote alternatives.
- Establishment of criteria (fuel types, burning areas) for prioritizing training burns and agricultural burning requests.
- Establishment of “no burn days” based on a PM_{2.5} daily forecast. A threshold similar to the current federal 24-hour standard of 65 $\mu\text{g}/\text{m}^3$ or the future 35 $\mu\text{g}/\text{m}^3$ may be used. No-burn day may be established based on 8-hour ozone predictions.
- Prohibition and/or restriction of burning hours in case of unexpected changes in meteorology conditions.
- Requirement of a Smoke Management Plan (where specific plans to curtail PM emissions and smoke are included) and the utilization of clean fuel for all prescribed and training burns.
- Restriction of total burn time and/or number of structures to be used for training burns, as well as limit multiple training events by single agency.

EMISSIONS REDUCTION

PM emissions from open burning are estimated at 0.62 ton per day. The portion attributed to agricultural burning is 0.03 ton per day (annual average day). Reductions are not determined.

RULE COMPLIANCE

This control measure would be implemented using existing resources. Requirements would be effective upon adoption. Agricultural burning would be phased-out by 2015.

COST EFFECTIVENESS

To Be Determined

IMPLEMENTING AGENCY

The District has the authority to implement this measure.

REFERENCES

Rule 444 – Open Burning California Code of Regulations, Title 17 – Agricultural Burning Guidelines

PM EMISSION REDUCTIONS FROM UNDER-FIRED CHARBROILERS [PM]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY:	UNDER-FIRED CHARBROILERS		
CONTROL METHODS:	PHASE I: CONDUCT FEASIBILITY STUDY BY 2010 PHASE II: IF FEASIBLE AND COST-EFFECTIVE CONTROLS ARE IDENTIFIED, RULE AMENDMENT AND FULL IMPLEMENTATION BY 2020		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	2002	2014	2020
PM INVENTORY	TBD	TBD	TBD
PM REDUCTION		TBD	TBD
PM REMAINING		TBD	TBD
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	AQMD/LOCAL GOVERNMENTS		

DESCRIPTION OF SOURCE CATEGORY

Restaurant operations emit PM and VOCs. Both of these pollutants can cause adverse health impacts, as well as causing a potential nuisance to the local community.

Background

The 1997 AQMP contained Control Measure PRC-03 - Emission Reductions from Restaurant Operations. Rule 1138, adopted in November 1997, implemented Phase I of this control measure, reducing 0.5 ton/day of PM₁₀ emissions from chain-driven charbroilers. Under-fired charbroilers are the largest contributor to the PM inventory contributing approximately eighty-three percent. Restaurant operations include charbroilers, griddles, deep fat fryers, ovens, and other equipment. The total PM₁₀ inventory is approximately 11.4 tons/day (11.3 of which is PM_{2.5}) and 1.6 tons/day VOC. Under-fired charbroilers are responsible for the majority of emissions from this source category (84 percent [9.6 tpd] of PM emissions, and 71 percent [1.2 tpd] of VOC emissions). Griddles account for approximately five percent of the total PM restaurant emissions inventory and four percent of the total VOC emissions. Oven emissions appear to be negligible. Based on the contribution of emissions from under-fired charbroilers, they were chosen as the next logical piece of basic equipment for which to seek cost-effective controls.

Regulatory History

The 1999 Amendment to the 1997 Ozone State Implementation Plan for the South Coast Air Basin listed PRC-03 – Emission Reductions from Restaurant Operations – Phase II, with reductions of 0.9 tons/day VOC and 7.0 tons/day of PM₁₀.

The Board received a report on emerging control technologies for under-fired charbroilers in May 1999. This report pointed out that a continuing effort to find cost-effective and technologically feasible controls for the restaurant industry has been ongoing since 1991. The earlier phases of this effort included the investment of significant resources in improving test methods and developing emission factors.

In August 2000, staff reported that cost-effective controls were limited and recommended substituting the remaining 0.9 tons/day of VOC emissions assigned to this source category with another control measure achieving excess VOC emission.

However, because of the significant contribution of the restaurant operations to the PM emissions inventory, the 2003 AQMP included Control measure PRC-03 – Emission Reductions from Restaurant Operation to reduce PM10 emissions by 1 ton per day by 2010. This limited emission reduction projection from a baseline of approximately 10 tpd was based on the fact that cost-effective controls for the majority of under-fired charbroilers had not been developed. A report to the Board was made December 2004 recommending findings of infeasibility be made, and substitute emission reductions from other adopted rules, as required by the 2003 AQMP. Staff also recommended funding for demonstration projects.

The Board authorized up to \$200,000 from mitigation fees collected pursuant to Rule 1309.1 – Priority Reserve, to fund six to eight new or retrofit demonstration sites on large restaurants. However, no applications have been received to date for this project.

PROPOSED METHOD OF CONTROL

Restaurant operations continue to be significant contributors in the PM10 and PM2.5 emission inventory. The District intends to continue its efforts in the research and development of control technologies that would cost-effectively reduce particulates from restaurant operations and intend to amend its rules should those technologies become available. This control measure would be implemented in two phases. Phase I would examine the feasibility of charbroiler controls with a study completion no later than 2010. If feasible and cost-effective controls are identified, adoption and full implementation would be targeted by 2020.

In conjunction with this effort, staff will also evaluate potential PM10 credit generation opportunities for use by other sources.

EMISSIONS REDUCTION

The emission reduction for this measure has not yet been determined.

TEST METHODS

In conjunction with the rule development process for Rule 1138 and associated source testing, the document “Protocol – Determination of Particulate and Volatile Organic Compound Emissions from Restaurant Operations” was published November 14, 1997. These test methods are currently being used for testing of charbroilers and potential control devices. The test methods are used by qualified

labs to certify the emissions level of specific control systems but are not employed to test emissions at individual restaurants.

COST EFFECTIVENESS

The cost-effectiveness of this control measure has not been determined. The AQMD will continue to analyze the potential cost impacts associated with implementing Phase I of this control measure including costs associated with generating emission reduction or credits, and will provide cost effectiveness as it becomes available.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from restaurant operations.

REFERENCES

Report to the Governing Board December 2004 - Staff Recommendations Regarding Controlling Emissions from Restaurant Operations.

GROUP 5

Multiple Component Sources

FACILITY MODERNIZATION**[NO_x, VOC, PM_{2.5}]**

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	ALL FACILITIES		
CONTROL METHODS:	ALL AVAILABLE CONTROL MEHODS RELATED TO TODAY'S BACT AND SUPERCOMPLIANT COMPOUNDS		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	2002	2014	2020
NO _x INVENTORY	19.1	12.4	11.7
NO _x REDUCTION		<u>3.0</u>	<u>6.2</u>
NO _x REMAINING		9.4	5.6
SUMMER PLANNING INVENTORY	2002	2014	2020
NO _x INVENTORY	20.9	13.7	13.0
NO _x REDUCTION		<u>3.3</u>	<u>6.8</u>
NO _x REMAINING		10.4	6.2
ANNUAL AVERAGE	2002	2014	2020
VOC INVENTORY	37.1	32.8	34.9
VOC REDUCTION		<u>2.0</u>	<u>10.6</u>
VOC REMAINING		30.8	24.3
SUMMER PLANNING INVENTORY	2002	2014	2020
VOC INVENTORY	43.0	37.9	40.4
VOC REDUCTION		<u>2.3</u>	<u>12.4</u>
VOC REMAINING		35.6	28.0
ANNUAL AVERAGE	2002	2014	2020
PM _{2.5} INVENTORY	8.2	8.1	8.5
PM _{2.5} REDUCTION		<u>0.7</u>	<u>2.2</u>
PM _{2.5} REMAINING		7.4	6.2
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

This control measure would obtain further emission reductions of NO_x, VOC, and PM_{2.5} by requiring that facilities modernize permitted equipment and processes and use supercompliant materials based on a set of pre-specified equipment useful life. Existing equipment would need to be

retrofit or replaced with today's BACT at the end of a pre-determined life span. Supercompliant VOC materials would also be required for surface coating applications, where feasible.

This comprehensive control strategy is comprised of five facility emission components:

- Combustion Sources – NO_x
- Fugitive VOC Emissions
- Industrial Coating and Solvents Operations - VOC
- PM_{2.5} Emissions from Facility Operations
- Fugitive PM_{2.5}

Background

BACT

The AQMD's New Source Review (NSR) programs¹ establish pre-construction permit review requirements for equipment or processes subject to permit requirements. Under NSR, applicants are required to incorporate BACT when new equipment is installed, existing stationary permitted equipment is relocated, or existing permitted equipment is modified such that there is an emissions increase. BACT means the most stringent emission limitation or control technique which:

- Has been achieved in practice for such category or class of source; or
- Is contained in any state implementation plan approved by EPA for such category or class of source (unless demonstrated to the satisfaction of the Executive Officer or designee to be not presently achievable); or
- Is any other emission limitation or control technique, found by the Executive Officer or designee to be technologically feasible for such class or category of sources or for a specific source, and cost-effective as compared to measures listed in the AQMP or rules adopted by the District Governing Board.

The process for determining BACT is significantly different between major and non-major polluting facilities. Major polluting facilities that are subject to NSR are required by the Clean Air Act to have the Lowest Available Emission Rate (LAER). LAER is determined at the time the permit is issued, with little regard for cost, and consistent with USEPA's LAER policy as to what is achieved in practice. For non-major polluting facilities, BACT is based on state law at the time an application is deemed complete. In most cases, this BACT is consistent with that specified in Part D of AQMD's BACT Guidelines. For this control measure, Part D of AQMD's BACT for non-major polluting facilities will be applied to all subject facilities.

¹ The NSR programs include Regulation XIII – *New Source Review* and Rule 2005 – *New Source Review for RECLAIM*.

Existing Equipment

Although control measures are routinely applied to existing sources, it is generally more difficult and costly to retrofit existing equipment with BACT than it is to apply BACT to a new source. The equipment being retrofit may not be compatible with current BACT if a specific process or method is needed. There may also be space restrictions that prevent installation of some add-on control technology.

Consequently, control measures targeting existing combustion sources typically do not reduce emissions to the same levels that would be obtained from the application of BACT. And, although NSR requires BACT for new, relocated, or modified equipment with an emissions increase, older equipment is allowed to remain in operation for many years, provided that the equipment complies with applicable rules for existing equipment. As a result, emission reductions to the level of BACT are not achieved for older equipment, and there is currently no mechanism that limits the continued use of such equipment.

This control measure ensures that as equipment ages and reaches the end of useful life, the equipment is either upgraded or replaced to meet today's BACT for non-major polluting facilities. Today's BACT is likely to be less stringent than the future BACT that would ordinarily be applied for equipment replacement at a future date. However, there is no assurance when the equipment will be replaced to take advantage of today's clean technology. This measure would provide the certainty for implementation of today's best available technology within the time frame of the attainment dates.

Regulatory History

This control measure would affect a wide variety of permitted equipment and processes. Consequently, the rules and regulations impacting the affected sources are extensive and are summarized briefly.

Regulation IV - Contains more than 35 rules that place prohibitions on equipment or operations. Several of these rules place restrictions on the exhaust concentrations of different combustion contaminants. For instance, Rule 474 (Fuel Burning Equipment - Oxides of Nitrogen) limits the NO_x emissions from fuel burning equipment. For recently permitted equipment, many of these rules are superseded by more stringent BACT limits.

Regulation IX is derived from federal law and specifies standards of performance for new stationary sources. The regulation consists of more than 70 subparts. Most of the standards in this regulation have been adopted by the District without change and are enforced by delegation from the USEPA. As an example, Subpart Eb provides standards of performance and emission guidelines for municipal waste combustors.

Regulation X is also derived from federal law and specifies standards for handling hazardous materials. The regulation consists of at least 15 subparts. The federal standards have been adopted by the District without change and are enforced under EPA authority.

Regulation XI contains source-specific standards and is composed of more than 85 rules. As an example, Rule 1110.2 (Emissions from Gaseous- and Liquid-Fueled Engines) places NO_x, CO, and VOC limits on engines. For engines that have been permitted for many years and have not been recently subject to BACT, this rule may be the most restrictive in terms of limiting engine emissions. Another example is Rule 1118 (Emissions from Refinery Flares). Regulation XI rules are tailored to specific types of air pollution sources.

Regulation XIII (New Source Review) sets forth the requirements that proposed new or modified stationary sources must meet before construction can take place. These requirements are in addition to those specified by other rules and include use of Best Available Control Technology, offset of emission increases, and a demonstration that air quality will not be diminished as the result of the construction or modification.

Regulation XIV (Toxics) consists of more than 15 rules that address toxic air contaminants. Rule 1401 pertains to the New Source Review of toxic air contaminants, and Rule 1402 controls toxic air contaminants from existing sources.

Regulation XX (RECLAIM) specifies requirements for facilities participating in the market incentive program, which is designed to allow facilities flexibility in achieving emission reduction requirements for NO_x and SO_x. Rule 2005 provides New Source Review requirements for RECLAIM facilities.

Regulation XXX (Title V Permits) defines permit application and issuance procedures and also compliance requirements associated with the federal Operating Permit Program. This regulation is mandated by Title V of the federal Clean Air Act.

PROPOSED METHOD OF CONTROL

The concept of this control measure is to ensure timely replacement of existing equipment to the cleanest technology available. The District, as part of rulemaking will develop a list of useful equipment life by equipment category. The equipment operators are expected to achieve BACT or equivalent emission limits. For VOC solvent/coating facilities, this measure would begin with 20 tpy or greater facilities to design a program to encourage application of supercompliant materials or process change to achieve emission reductions.

During the rulemaking process for this control measure, a more detailed analysis will be performed to establish appropriate useful lives for various equipment categories and size ranges. Special consideration will be given to past retrofit requirements and investments made, to ensure that reasonable useful lives for various equipment types are obtained. SO_x and NO_x equipment will be considered as part of CM #2007CMB-02 and CM #2007LTM-03, respectively.

As part of its efforts to implement this control measure and to promote facility modernization, the District will forge partnerships with local businesses, trade organizations, environmental groups, and other stakeholders, and pursue state and federal tax incentives. Early replacement of equipment significantly prior to specified useful life may qualify for the tax incentives or potential credit generation.

EMISSIONS REDUCTION

The emission reductions for NO_x, VOC and PM_{2.5} are shown in the summary table. There will also be concurrent emission reductions in SO_x, and CO.

RULE COMPLIANCE AND TEST METHODS

Compliance with the provisions of this control measure would be based on monitoring, recordkeeping, and reporting requirements that have been established in either the RECLAIM program or existing source-specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST EFFECTIVENESS

Cost-effectiveness has not yet been determined for this control measure. Consideration would be given for evaluating the cost for the loss of equipment useful life from early equipment replacement or retrofit.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from the targeted sources.

REFERENCE

South Coast Air Quality Management District. Best Available Control Technology Guidelines. July 14, 2006.

**URBAN HEAT ISLAND
[ALL POLLUTANTS]****CONTROL MEASURE SUMMARY**

SOURCE CATEGORY:	ROOFING, PAVING, AND BUILDING MATERIALS AND TREE PLANTING PROJECTS
CONTROL METHODS:	USE OF MORE REFLECTIVE AND LIGHTER COLOR SURFACES ON EXTERIOR SURFACES LOCATED IN URBAN AREAS
EMISSIONS:	IMPLEMENTATION OF THIS CONTROL MEASURE IS EXPECTED TO LOWER AMBIENT TEMPERATURES IN URBAN AREAS. LOWER AMBIENT TEMPERATURES WOULD DECREASE THE FORMATION OF OZONE, WHICH IN TURN IS EXPECTED TO RESULT IN IMPROVED AIR QUALITY.
CONTROL COST:	NOT DETERMINED.
IMPLEMENTING AGENCY:	AQMD, CEC, LOCAL GOVERNMENT

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to encourage activities that would lower ambient temperatures in urban areas. This control measure focuses on encouraging activities such as using lighter, more reflective surface materials and increased tree planting.

Background

Over the past four decades, summer temperatures in urban cities throughout the nation have increased by 2 to 4°F. Since 1940, it is estimated that peak temperatures in Los Angeles have increased approximately 5 to 6°F (Akbari, et al, 1990; EPA, 1990). The increased temperatures are primarily occurring in urban areas. Moreover, studies have shown that summer temperatures in urban areas are typically 2°F to 8°F higher than in their rural surroundings. (EPA, 1992).

The difference between urban and rural temperatures is referred to as the “urban heat island effect.” The replacement of natural vegetation such as trees, grass, and soil with concrete and asphalt reduces the landscape’s ability to lower daytime temperatures and loses the benefits of shade. In addition, the use of dark colored materials and surfaces that absorb, rather than reflect incoming solar energy adds to the effect, thus increasing temperatures in cities and urban areas.

The urban heat island effect has adverse impacts on air quality and energy demands. The increased solar gain absorbed by the city can increase energy demands for cooling and accelerate ozone formation. Studies indicate that in large metropolitan cities such as Los Angeles, utility peak loads will increase 1.5 to 2 percent for every 1°F increase in temperature. In Los Angeles, energy loads for both Los Angeles Department of Water and Power (LADWP) and Southern California Edison (SCE) increase by about 2 percent per °F with respect to the base load (Taha, et al, 1992).

The ability of a surface to reflect is referred to as albedo and is measured from zero to one, with one representing the most reflective and zero representing the most absorbent. Most buildings and cities have albedos between .20 and .35 (Akbari, et al, 1990). To reduce urban temperatures, albedos can be increased by using lighter, more reflective materials on surfaces of roofs and pavement (roads and parking lots). In addition to providing shade to buildings and surfaces, trees cool the air directly by evapotranspiration and block solar radiation and prevent these structures and surfaces from heating up beyond the ambient temperature (LADWP, 1992). Moreover through evapotranspiration, the natural releasing of water vapor from leaves and trees cools the environment, thus bringing down the temperature of the entire area.

A preliminary air quality modeling analysis indicates cooler surfaces and tree planting can improve the ozone air quality in Los Angeles. Initial results indicate that through cooler surfaces for homes, office-building roofs, and paved surfaces, and planting 11 million trees in Los Angeles, that the heat island effect can be reduced between 3 - 7°F (Rosenfeld, et al, 1996).

In May 2002, the District co-funded a project with the City of L.A., L.A. Department of Water and Power, Lawrence Berkeley Laboratories and the California Energy Commission to assess the effects of using lighter colored roofing materials to improve energy efficiency and to lessen the urban heat island effect. A field study was conducted to measure the changes in surface temperatures in light colored roofing and paving materials installed in and around the L.A. Zoo. This and other studies will provide better data on the effectiveness of lighter colored materials to lessen the urban heat island effect.

A study was conducted in 1998 to quantify the air quality benefits of the cool community concept by applying an appropriate air quality modeling approach (ENVIRON, 1998). Cool communities impacts on temperature and dispersion were mapped using the Urban Airshed Model (UAM) to evaluate the meteorological effects on ozone formation and transport within the Basin. Maximum ozone reductions were found to be about 8 parts per billion (ppb). A follow-up study was conducted to explore ways in which the air quality benefits that accrue from the implementation of urban heat island mitigation strategies can be converted into quantifiable emission reductions (ENVIRON, 2001). This study analyzed three options for regulatory approaches in generating emission reductions including: local governments modifying building codes to require the use of light colored materials, public or private groups providing cash or other incentives to building owners to install lighter colored materials, and the District requiring the use of lighter colored materials with the resulting emission reductions applied for SIP purposes.

Regulatory History

In January 1992, the EPA introduced a publication, *Cooling Our Communities: A Guidebook on Tree Planting and Light-Colored Surfacing*. This guidebook discussed the causes, magnitude and impacts of increased urban heat islands.

There are communities within the Basin which have tree planting programs and ordinances already in effect. In addition, some utilities provide educational guidance brochures regarding tree planting.

PROPOSED METHOD OF CONTROL

This control measure proposes to develop a program to promote the use of light colored roofing and pavement materials, solar roofing membranes, and increased tree planting. Programs to promote use of more reflective pavement and tree planting could be a required element for new sources, or could be included as recommendations through the District's California Environmental Quality Act (CEQA) Air Quality Handbook. Sources such as builders, utilities, cities and local government agencies, and private citizens, etc. that promote the use of lighter colored materials and increased tree planting could be eligible for an emission credit. Emission credits could be issued based on types of surface materials used or numbers of trees per unit or area that meet or exceed a specified benchmark.

There are a variety of techniques that can be implemented to reduce urban temperatures and increase the albedo of roofs, pavements, and building surfaces. Most of these techniques can be implemented during the maintenance or modification of existing structures or during the building stages of new structures.

Roofing Materials

The reflectivity of roofs is measured in terms of roof temperature at noon on a clear summer day, with an air temperature of 90°F, averaged over the warranted life of the roof. A gray roof with a smooth or washable texture would have a roof temperature under the aforementioned conditions of approximately 160°F. A light green roof has a higher albedo, and accordingly a lower surface temperature of 135°F.

One method of achieving higher albedos is to coat existing surfaces or modify the makeup of new surfaces so that they incorporate lighter colored materials. Available techniques for roof whitening include, but are not limited to the following (Taha, et al, 1992):

- adding light-colored aggregate to the roofing material;
- light-colored rocks on flat or gently-sloped roofs;
- colored or painted roofs;
- coating with elastomeric coatings and single plies; and
- using light-colored concrete tiles on sloping roofs.

In addition to these techniques, the use of integrated roofing membranes using solar photovoltaic arrays can have a combined effect of lowering the thermal impacts on commercial and industrial building roofs while at the same time supplying the electricity needs of these buildings. Such products consist of an array of photovoltaic modules integrated into a flexible polyester-based roofing membrane. These roofing membranes have relatively high albedos (e.g., 0.8) and can be equipped with insulation thereby, reducing the thermal impacts on roofs. The photovoltaic modules convert much of the incoming sun's energy directly into electricity, substantially reducing the energy absorbed by a roof.

Pavement and Building Surface Materials

Within the city, there are a number of urban surfaces such as streets, sidewalks, parking lots, school yards, and other similar surfaces, that have dark surfaces. The following identifies techniques that can be implemented to lighten urban surfaces (Taha, et al, 1992, Pomerantz, 1996):

- using light-colored aggregates in the upper layer of the asphalt in new pavements;
- using a light-colored slurry or chip seal when resurfacing;
- using concrete rather than asphalt, with a light-colored aggregate and binder;
- whitetopping (light-colored concrete pavements);
- using artificial lighteners in preparing the mixtures of asphaltic concrete and slurry seals; and
- using paints of light colors that are designed specifically to resist weathering, wear and tear, and other environmental effects.

In addition to selecting materials with high albedos, other considerations are important to ensure that materials maintain their original albedos. Considerations that should be taken into account include, but are not limited to material wear resistance, effects of soiling, and surface texture. In addition, in selecting materials for roads, parking lots, and driveways, it is important that the light-colored surface has a non-skid finish.

Tree Planting

To help lower an entire city's temperatures through evapotranspiration, street trees need to be planted in public as well as private spaces such as parking lots, plazas, street meridians, sidewalks, residential yards, corporate lawns, parks, and shopping plazas (EPA, 1992). For homes and buildings, the most dramatic cooling takes place when trees directly shade windows, walls, roofs, and air-conditioning units (LADWP, 1992). For residences, most experts suggest planting three or more trees, placing them so they will shade the home and outdoor living areas during the summer months (SCE, 1991). The air conditioning savings are even greater when the tree shades an office building with large windows and long air conditioning hours.

A general rule of thumb is to plant at least five to ten feet from a structure; moreover, the shape and projected mature spread of the tree should be taken into account in this distance (LADWP, 1991). To maximize the evapotranspiration of tree planting programs, the placement of trees in cities is important. The following identifies tree planting strategies that should be considered to maximize the cooling benefits associated with increased tree planting:

- shade east- and west facing walls and windows of home or building to reduce air conditioning energy consumption,

- shade roofs to lower the temperature of interiors of homes and buildings, external surfaces, and surrounding environment,
- shade outdoor air conditioning units to increase its efficiency,
- shade nearby walls and flat surfaces such as walkways, driveways, alleys, and the streets, and
- plant trees to influence wind movement and circulation around and through residences and buildings.

In selecting shade trees for large-scale planting, they must be low biogenic emitters (Benjamin & Winer, 1994). Consideration should also be taken for their tolerance to air pollution, water requirements, effect (or lack of effect) on sidewalks, sewer lines and overhead electric lines, and insect and pest resistance (Corchnoy, et al, 1991). The shape, size, species, as well as fire hazards are important to consider in selecting shade trees. In selecting species, it is important that trees with the potential to produce biogenic hydrocarbon emissions be avoided. The District would work with interested parties to develop a list of species of trees that would be recommended for shading.

Currently there are programs such as the \$3.5 million dollar effort by the California Urban Forests Urban Council. In addition to tree planting in the Los Angeles area, this project provides services in public education, management support to urban foresters, support to public agencies, government to develop urban forest initiatives and urban forest service and research.

EMISSIONS REDUCTION

Implementation of this control measure is expected to decrease ambient temperatures in the Basin, particularly during summer months. Improved air quality is expected as a result of lower urban temperatures.

RULE COMPLIANCE

Implementation of this measure could be based on the following:

- local government model ordinances;
- legislative strategies for incentives; and
- public outreach for consumer awareness.

In addition, the District may consider the development of an emissions credit mechanism to provide emission credits based on the number of units modified or installed that use materials and colors meeting or exceeding a specified benchmark.

TEST METHODS

ASTM Sub-Committee E06-21 has developed E1980-01 Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces to determine indexes and surface temperatures for surfaces with emissivity greater than 0.1.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not yet been fully determined. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

Implementation of this measure is expected to require the partnership of the District, CEC, and local government.

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ENERGY EFFICIENCY AND CONSERVATION [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY:	STATIONARY SOURCE FUEL COMBUSTION CATEGORIES
CONTROL METHODS:	INCENTIVES FOR HIGH FUEL EFFICIENCY EQUIPMENT
EMISSIONS (TONS/DAY):	NOT DETERMINED
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF PROGRAM

Background

Energy efficiency and conservation programs reduce emissions of all pollutants and tend to be cost effective. There is a renewed interest in efficiency and conservation programs at local, state, national and international levels. Industrial and commercial businesses and the public also share this interest.

In the 1991, 1994, 1997, and 2003 Air Quality Management Plans the District included energy efficiency and conservation components. The 1991 AQMP included control measures for residential, commercial and industrial sectors and local government conservation measures. That AQMP also included efficiency and conservation goals developed in cooperation with other agencies and affected businesses. The plan included electricity conservation goals of 5 to 15 percent for different sectors and natural gas conservation goals of 20 to 30% for commercial and residential sectors. In later AQMPs, energy efficiency and conservation were addressed within specific control measures.

The 1991 AQMP also addressed global warming and ozone depletion. The District committed to specific measures to reduce emissions of compounds that contributed to both ozone depletion and global warming. In addition, the District committed to working with other agencies to reduce global warming through energy efficiency and conservation.

Current Regulatory Programs

Promoting Clean Energy

Promoting cleaner sources of energy has always been a component of the AQMP. Clean energy produces less air pollution and includes sources such as solar, wind, hydro, bio-fuels and hydrogen. Solar energy can produce electricity using photovoltaic cells or thermal energy by heating water or a heat transfer fluid. Wind can be used to generate electricity using windmills in locations where winds are strong and constant. Examples of bio-fuels include ethanol and

bio-diesel produced from plants. Hydrogen can be produced in a variety of ways and when used as a fuel the only byproduct of combustion is water. Electric and hybrid electric vehicles are also cleaner and result in fewer emissions of nitrogen oxides, hydrocarbons and particulate matter compared with conventional gasoline powered vehicles.

Renewable energy sources such as hydro, solar and wind, as well as alternative fuels and electric and hybrid electric vehicles are all components of the draft plan. The CARB and AQMD have emission reduction targets for mobile sources that include alternative fuels and hybrid and electric vehicles.

The CEC has established a goal for electric utilities of producing 33% of the state's electricity from renewable resources. Also, at the state level, California also has a solar initiative whose main focus is the installation of photovoltaic cells on residences and commercial buildings to help reduce peak electricity demand. The state will also promote clean energy sources as a means of reducing global warming gasses under a new state law. Greenhouse gasses must be reduced 25% by 2020.

Reducing Energy Demand

Currently there are a variety of programs at the federal, state and local level for reducing energy demand. At the federal and state level, the U.S. Department of Energy (DOE) and the California Energy Commission (CEC) develop minimum energy efficiency standards for residential, commercial and industrial equipment. The USEPA oversees the Energy Star program which promotes energy efficient appliances and equipment for residential, office and commercial use by identifying equipment that exceeds efficiency standards. Equipment which significantly exceeds standards can use the energy star label in advertising and are listed in the energy star database.

Public utilities in California promote conservation and efficiency through advertising rebate programs that offset the cost of energy efficient equipment and conservation programs. These programs are supported by the CEC and the California Public Utilities Commission (PUC).

Reducing energy demand in California through efficiency and conservation is the responsibility of the CEC and PUC. These two agencies in cooperation with utilities and local governments assure the state has an adequate energy supply as well as establish efficiency and conservation goals. Utilities and local governments provide incentives to help meet these goals.

State and Federal Initiatives and Programs

Currently there are a variety of energy efficiency and conservation programs at the federal, state and local level. At the federal and state level, the U.S. DOE and the CEC develop minimum energy efficiency standards for residential, commercial and industrial equipment. The USEPA Energy Star program promotes energy efficient appliances and equipment for residential, office and commercial use which significantly exceed standards.

The California Energy and Public Utilities Commissions require natural gas and electric utilities to include energy efficiency and conservation programs in their operations. Utilities have

specific energy conservation goals and commit funds and other resources to provide incentives for property owners and businesses to purchase energy efficient equipment and initiate energy conservation and management programs. Currently, electric utilities have been set a long term goal of having 33% of their generation produced by renewable energy sources.

In addition, California has recently established a program to reduce emissions of greenhouse gasses – pollutants that contribute to global warming. The program has a goal of reducing emissions by 25% from current levels by 2020. This goal will be achieved in part through promotion of energy efficient technologies and energy conservation.

The state also has a solar initiative program whose emphasis is increasing the amount of energy produced through solar energy. A major focus of this program is to increase the number of photovoltaic systems on residential and commercial buildings to reduce the peak electricity demand on summer afternoons.

At the local level, counties and cities also have energy efficiency and conservation programs and promote conservation by providing incentives to building projects which meet LEED standards (Leadership in Energy and Environmental Standards). LEED is an energy and environmental standards certification program developed by the non-profit U.S. Green Building Council. Local governments can provide a variety of incentives to developers whose projects meet LEED standards such as a quicker review of permit applications.

The USEPA also provides guidance to local air pollution control agencies for including energy efficiency and conservation programs in their state implementation plans. Emission reductions must be quantifiable, enforceable and in excess of reductions from other programs and regulations.

Energy Demand Projections

Information developed by the CEC in the first half of 2006 indicated that the projected increase in demand for natural gas and electricity are expected to be in the range of 1 to 1½ percent per year for the years covered by the AQMP. A similar increase in demand is expected for transportation fuels (i.e., gasoline and diesel). The effect of the state program to reduce greenhouse gas emissions is not known at this time. However, energy conservation and use of more efficient technologies would be expected to mitigate the projected increases in demand for fossil fuels and electricity and would reduce emissions of greenhouse gasses.

Energy Conservation and Efficiency Program Assumed in the Plan

The energy demand forecasts provided by the gas and electric utilities include conservation and efficiency programs that have been established through the PUC and CEC. The energy projections provided to the District for the AQMP include these conservation goals. All required conservation measures have been included in the energy projections for the plan.

The utility programs include rebates for energy efficient equipment such as lights, motors, pumps, boilers, and water heaters. They also offer energy audit and monitoring services to help business become more efficient, save energy and reduce costs. These programs and public

service advertising are the way each utility achieves the energy conservation goals set for it by the PUC.

PROPOSED METHOD OF CONTROL

The proposed method of control is to provide incentives for businesses or residents to use energy efficient equipment in the District and increase the effectiveness of existing energy conservation programs. The District is proposing to develop and implement specific energy efficiency and conservation programs above and beyond the state and federal mandated programs to achieve further emission reductions. It should be noted that the impact of existing federal and state programs are already reflected in the District's projected emissions forecast.

Under this measure, monetary incentives could be provided to accelerate the retirement existing of equipment (e.g., boilers, water heaters) subject to AQMP rules and replacement of these equipment with high fuel efficiency units. Such approach will not only have the benefit of achieving early NOx reductions due to early compliance with NOx emission limits, but it will also provide additional NOx benefits based on the use of more fuel efficient equipment. The District will work with utility companies to provide additional incentives for property owners and businesses to purchase more fuel or energy efficient equipment. Funding for these programs could come from a variety of sources including the District Priority Reserve (AQMD Rule 1309.1) or mitigation fees (e.g., from federal sources). The District will conduct an assessment of the cost and the cost-effectiveness of specific energy efficiency and conservation measures before launching this program. Close coordination with vendors supplying high efficiency equipment as well as with local governments to explore opportunities to increase program outreach would be critical for the success of this program.

EMISSIONS REDUCTION

The amount of emission reductions will be determined during implementation of this control measure. Emission reductions will be in excess of reductions achieved by current regulatory programs.

Energy and environmental impacts of the proposed energy efficiency measure will be evaluated during the CEQA process as a part of the Draft Final AQMP. Impacts on emissions of criteria air pollutants, electricity and fossil fuel demand and emissions of global warming gasses will be assessed in the CEQA document.

RULE COMPLIANCE AND TEST METHODS

Compliance with the provisions of this control measure would be based on monitoring, recordkeeping, and reporting requirements that have been established in existing source specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

Emissions quantification protocols will establish the appropriate test methods that applicable source categories will be required to use when generating and using emission credits under this program.

COST EFFECTIVENESS

The cost effectiveness has not been determined. In general, energy efficiency and conservation measures tend to be cost effective.

IMPLEMENTING AGENCY

The implementing agencies would include the District and local governments.

REFERENCES

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EMISSIONS REDUCTION FROM GREENWASTE COMPOSTING [VOC, PM AND NH₃]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:		GREENWASTE COMPOSTING	
CONTROL METHODS:		BEST MANAGEMENT PRACTICES AND/OR CONTROL TECHNOLOGIES	
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	2002	2014	2020
VOC INVENTORY	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD
VOC REMAINING		TBD	TBD
SUMMER PLANNING INVENTORY	2002	2014	2020
VOC INVENTORY	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD
VOC REMAINING		TBD	TBD
ANNUAL AVERAGE	2002	2014	2020
NH3 INVENTORY	TBD	TBD	TBD
NH3 REDUCTION		TBD	TBD
NH3 REMAINING		TBD	TBD
ANNUAL AVERAGE	2002	2014	2020
PM10 INVENTORY	TBD	TBD	TBD
PM10 REDUCTION		TBD	TBD
PM10 REMAINING		TBD	TBD
CONTROL COST:		TO BE DETERMINED	
IMPLEMENTING AGENCY:		AQMD	

DESCRIPTION OF SOURCE CATEGORY

Greenwaste composting is a biological process where greenwaste (organic waste generated from gardening, agriculture, and/or landscaping activities) is decomposed under controlled environment to produce a soil-like product called compost. Greenwaste composting is an important component of the solid waste industry; it provides resource conservation through source reduction, recycling, and reuse. However, it produces air emissions that are currently uncontrolled. Greenwaste composting is a source of direct dust, VOC (4.4 tons/day), and ammonia, a precursor of particulate matter (1 ton/day). It also releases carbon dioxide, water vapor, and methane, which are greenhouse gases. In addition, greenwaste composting can generate odors, a common public nuisance, if not properly operated. Emissions and odors from greenwaste composting can be reduced by maintaining optimal aerobic conditions thru best management practices, or utilizing ag-bag, enclosure, as well as state-of-the art emissions control technologies, such as aeration static pile (ASP) and in-vessel equipped with a control device such as bio-filter.

Background

Control Measure (CM) WST-02 – Emission Reductions from Composting, included in the 1997 and 2003 AQMPs, as well as the 1999 Amendments to the 1997 Ozone State Implementation Plan (SIP) for the SCAB, called for the development of feasible control strategies to reduce VOC and ammonia emissions from composting activities. As such, Rule 1133.2 – Emission Reductions from Composting Operations and Related Operations, was adopted in January 2003. Rule 1133.2 partially implements CM WST-02 because it only focused on controlling the emissions from co-composting operations (bio-solids).

Although the 2002 AQMD's and the California Integrated Waste Management Board's (CIWMB) source testing revealed that greenwaste composting was a significant source of VOC, at that time, staff only proposed minimal registration requirements for greenwaste composting, with the intention to track their operations and emissions. According to staff's affordability analysis conducted in 2002, control options (enclosure, ASP, in-vessel, and bio-filter) identified for co-composting may have adverse impacts on the greenwaste composting industry despite their cost-effectiveness.

During the Rule 1133.2 development process, staff identified approximately 16 greenwaste composting facilities in the AQMD's jurisdiction. Most of these facilities compost their greenwaste in long piles called windrows. In order to maintain optimal aerobic conditions, which would in turn, reduce emissions and odors generated during the decomposition process, windrows must be turned frequently by front-end loaders.

Regulatory History

Currently, operators of greenwaste composting facilities located in the AQMD's jurisdiction are required to comply with AQMD Rule 203 – Permit to Operate (for equipment that require permits), Rule 401 – Visible Emissions, Rule 403 – Fugitive Dust, and Rule 1133 (for registration and annual update).

Depending on the throughput levels, greenwaste composting facilities are either required to comply with the Local Enforcement Agency (LEA) Notification requirements set forth in Title 14, California Code of Regulations, Division 7, Chapter 5.0, Article 3.0, or obtain a Compostable Materials Handling Facility Permit from the CIWMB pursuant to Title 27, California Code of Regulations, Division 2, Subdivision 1, Chapter 4.0, Subchapters 1 and 3, Articles 1, 2, 3, and 3.1. However, neither AQMD nor state regulations require specific emission controls from the greenwaste composting industry.

Assembly Bill (AB) 939 (California Integrated Waste Management Act):

In September 1989, AB 939 was passed into law and was incorporated into the California Public Resources Code, Division 30, §40000 et seq. (Division 30). Division 30 is implemented by CIWMB. It mandates cities and counties to achieve a total waste diversion of 25 percent by 1995, and a total waste diversion of 50 percent by 2000, based on the 1990 baseline. Division 30 also requires California to secure a long-term disposal capacity. Since organic waste (foodwaste and greenwaste) only accounted for approximately 25 percent of California's waste stream in 1999, recycling, reuse, and source reduction have been widely promoted to achieve such goals.

Work conducted by CIWMB:

CIWMB conducted several source tests on greenwaste chipping and grinding, as well as composting in conjunction with similar work performed by the District. Studies have been commissioned by CIWMB to UC Davis and San Diego State University to evaluate greenwaste composting processes, including characterization of emissions (e.g., VOC, PM, NH₃, and green house gases). CIWMB also conducted testing and studies on BMPs (i.e., feedstock controls, aeration techniques) and on biogenic emissions from greenwaste.

A greenwaste composting facility is also required to obtain or renew its Conditional Use Permit from the city and/or county offices in the jurisdiction where the facility is located.

PROPOSED METHOD OF CONTROL

The proposed control method will be divided into two phases:

Phase I - Review recent studies on emission factors and BMPs to refine inventories and to assess reduction potential.

Phase II – Program development including potential rule development to incorporate technical feasible and cost-effective BMPs or controls. Any future regulatory actions (e.g., reducing greenhouse gases) that provide concurrent reductions will be SIP creditable. AQMD will convene a working group involving all stakeholders to develop cost-effective and workable solutions for this source category.

EMISSIONS REDUCTION

The emission reduction potential for this measure is not determined at this time.

RULE COMPLIANCE

An AQMD regulation or other enforceable instrument will be considered to ensure emission reductions. The most effective regulating tool will be selected based on the BMP options. Implementation of this control measure will not conflict with efforts under AB939.

TEST METHODS

AQMD staff will work with CIWMB to develop appropriate test methods, based on BMPs.

COST EFFECTIVENESS

Cost-effectiveness for BMPs will be determined during rule development process.

IMPLEMENTING AGENCY

AQMD with consultation of CIWMB.

REFERENCE

Technology Assessment for Proposed Rule 1133: Emission Reductions from Composting and Related Operations, AQMD, March 13, 2002

EMISSION REDUCTIONS FROM NON-DAIRY LIVESTOCK WASTE [VOC, NH₃]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	LIVESTOCK WASTE [POULTRY AND SWINE]		
CONTROL METHODS:	BEST MANAGEMENT PRACTICES, FEED VARIATIONS, CONTROL DEVICE INSTALLATION		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	2002	2014	2020
VOC INVENTORY	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD
VOC REMAINING		TBD	TBD
SUMMER PLANNING INVENTORY	2002	2014	2020
VOC INVENTORY	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD
VOC REMAINING		TBD	TBD
NH ₃ INVENTORY	TBD	TBD	TBD
NH ₃ REDUCTION		TBD	TBD
NH ₃ REMAINING		TBD	TBD
CONTROL COST: TO BE DETERMINED			
IMPLEMENTING AGENCY: AQMD WITH THE COOPERATION OF STATE AND LOCAL RESOURCE AGENCIES			

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to seek emission reductions from confined livestock [poultry and swine] facilities.

Background

Livestock waste emissions are precursors to both ozone and fine particulates (PM_{2.5}). Although confined animal facilities have been relocating out of the District's jurisdictional boundaries for years the District still retains over nine million poultry (egg layers and broilers) and more than 15,000 hogs and pigs (swine). Additional VOC and NH₃ emission reductions could be achieved by requiring control actions above those required by Rule 223 by applying similar requirements to facilities not large enough to be covered by the rule.

Source Description

The following information was obtained from a report prepared for the US EPA (US EPA, August, 2001). Laying hens or layers are sexually mature female chickens maintained for the production of eggs, primarily for human consumption. These eggs are known as table eggs and

may be sold as shell eggs, or may be used in the production of liquid, frozen, or dehydrated eggs. Laying hens maintained for table egg production are almost exclusively confined in cages, which allow automation of feed distribution and egg production. Most confinement facilities for laying hens are mechanically ventilated to remove moisture and carbon dioxide produced by respiration. Exhaust fans draw air into the building through slots located along the perimeter of the roof under the eaves. Manure is typically collected at commercial egg-production facilities in two types of laying hen houses. One is a manure belt house where manure is collected as frequently as daily but typically every three to four days and stored in open storage piles. The other type of laying hen house is referred to as a high-rise where manure accumulates below the laying hen houses and is collected on an annual or semi-annual basis. At either facility manure is spread on the ground to allow the material to dry before it is sold or delivered as fertilizer.

Swine (hog) operations can be of several types. The most common is the farrow-to-finish operation that encompasses all three phases of swine production (farrowing, nursing, and finishing). The animals are typically housed in confinement buildings that are either totally enclosed or open-sided with curtains. Totally enclosed facilities are mechanically ventilated throughout the year. Open-sided buildings are naturally ventilated the majority of the year, but may be mechanically ventilated when the curtains are closed due to weather conditions. Manure may be flushed from the floor of the housing or fall through slats in the floor to a pit underneath the floor. Manure in the pit may be flushed or scraped (SJVUAPCD, 2006).

Data from the UC Cooperative Extension indicates that there are 34 active laying-hen poultry facilities within the jurisdictional boundaries of the AQMD. All of these facilities are located in Riverside and San Bernardino County. In total, these facilities have approximately 8.4 million egg-producers, commonly referred to as layers. According to the UC Cooperative Extension, there are also seven confined pullet (also referred to as young hens, usually less than one year old) facilities (Kuney, 2005). AQMD permitting data indicates that there are four egg production facilities that are defined as LCAFs but that there currently are no swine production facilities that have permits.

Emissions

Emission factors are a critical part of emission calculations and there is a fair amount of discrepancy relative to the emission factors by different jurisdictions for different type of operations. Due to ongoing research, these numbers may change as more detailed research data is made available. The interim emission factors currently used by AQMD staff for calculating emissions from layer hens and swine operations are provided. It should be pointed out that for certain chicken farm operations the applicable emission factors from ammonia can be ten times as high as the emission factors shown in the Table below that could potentially increase the emissions inventory for ammonia from these operations by an order of magnitude.

Emission Factors

	Ammonia (lb/hd/year)	PM10 (lb/hd/year)	VOC (lb/hd/year)
Layer Hens ¹	0.096	0.0308	0.02565
Swine	20.3	N/A	4.6 ²

To improve the current emission factors, further studies are currently being conducted at different locations. It is anticipated that improved emission rate data will be available prior to implementation of this control measure.

REGULATORY HISTORY

Agricultural operations represent a significant source of air pollution throughout the state. SB 700, which was enacted into law as of January 1, 2004, eliminated the exemption from the permit system of local air pollution control districts for agricultural operations in the farming of crops or raising of fowl or animals. The bill amended air pollution control requirements in the California Health & Safety Code to include requirements for agricultural sources of air pollution.

Rule 223 was adopted in June of 2006 to satisfy the SB 700 requirement that all Large Confined Animal Facilities (LCAF) have permits that seek to minimize their emissions. Rule 223 requires that all LCAFs apply for and obtain a permit that includes a mitigation plan that the LCAF will implement to reduce emissions. Rule 223 requires compliance with Best Available Retrofit Control Technology (BARCT) when developing mitigation plans but does not mandate any specific measure.³ To serve as interim BARCT guidelines, Appendix A of Rule 223 contains a list of the Emission Mitigation Measures for use by applicants when developing a mitigation plan. This list was developed in consultation with and general agreement of stakeholders, including Western United Dairymen, Milk Producers Council, Inland Empire Poultrymen, Inc. and Pacific Egg and Poultry Association. The Rule 223 Appendix A list of measures includes both Class One Mitigation Measures and Class Two (more stringent) Measures.

PROPOSED METHOD OF CONTROL

Depending on the ultimate size of the emissions inventory, this control measure would aim to mandate the Class Two Mitigation Measures of Rule 223, with a higher level of overall control efficiency for the larger facilities and seek reductions from the smaller facilities not subject to Rule 223, possibly through requirements to implement Rule 223 Class One Mitigation Measures. Examples of Rule 223 Class Two Mitigation Measures for poultry facilities include:

- Vent housing to a VOC control device with an overall capture and control efficiency of at least 80%

¹ Rule 223 Draft Final Staff Report, South Coast Air Quality Management District, June 2006.

² Rule 4570 Draft Final Staff Report, San Joaquin Valley Unified Air Pollution Control District, May 2006.

³ BARCT is defined as an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source.

- Use of a belt litter removal/drier system, or use a tunnel ventilated houses, or litter drying systems
- Store manure in an enclosure vented to a control device

Currently, Rule 223 does not have any Class One or Two Measures for swine production; however, similar measures (e.g., manure management) could be developed.

EMISSIONS REDUCTION

Emission reductions associated with this control measure would depend on the control strategy pursued and will be quantified in conjunction with an evaluation of the existing emission factors for this source category.

RULE COMPLIANCE

Compliance with this control measure can be monitored through recordkeeping and inspections.

TEST METHODS

The appropriate test methods for this control measure would depend on the control strategy implemented.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not yet been determined. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide cost-effectiveness information as it becomes available.

IMPLEMENTING AGENCY

The District has the authority to adopt and enforce rules and regulations to achieve and maintain the state and federal ambient air quality standards in all areas affected by emission sources under its jurisdiction (Health and Safety Code §40001).

REFERENCES

Kuney, Doug, UC Cooperative Extension, personal communication with Mike Laybourn, February 2005.

SJVUAPCD (San Joaquin Valley Unified Air Pollution Control District), Final Draft Staff Report for Proposed Rule 4570 – Confined Animal Facilities, May 18, 2006.

US EPA, Emissions from Animal Feeding Operations, Contract No. 68-D6-0011, Draft, August 2001.

IMPROVED START-UP, SHUTDOWN AND TURNAROUND PROCEDURES [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY:	ALL SOURCES CATEGORIES
CONTROL METHODS:	OPERATIONAL PROCEDURES
EMISSIONS (TONS/DAY):	NOT DETERMINED (SEE EMISSIONS REDUCTION SECTION)
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

Background

Equipment start-up, shutdown and turnaround are typically associated with significantly higher emission rates compared to the emission rates observed from the same equipment operating under steady state or normal operating conditions. The higher emission rates observed during start-up, shutdown and turnaround are in part due to the higher loads equipment are subjected to during these transient operating conditions compared to the normal operating conditions as well as the lead times necessary for the conditioning of certain control technologies. The emission rates observed during start-up, shutdown and turnaround, in addition to the equipment design, are influenced by the speed by which a particular equipment is fired to reach normal operating conditions or taken out of service. Start-up, shutdown or turnaround, often adversely impact the emission rates from equipment that are interconnected, either upstream or downstream to equipment undergoing start-up/shutdown. This is a phenomenon commonly observed in refinery operations and chemical plants that rely on interconnected equipment and processes. Refinery operations predominantly rely on flares to minimize the emissions impact resulting from start-up, shutdown and turnarounds. However, there are adverse environmental impacts associated with the use of flares as well.

On November 4, 2005 the AQMD Governing Board adopted an amendment to Rule 1118 - Control of Emissions from Refinery Flares. In an effort to minimize flaring and associated emissions, the amendment established declining emission targets over time that each refinery operation had to meet. The amendment eliminated the flaring of vent gases except for those resulting from emergencies, shutdowns and startups, turnarounds and essential operational needs. The amendment also established operational requirements of diagnostic practices to minimize flaring.

Reducing flaring and associated emissions continued to be an area of intense interest by the community, regulators as well as industry. The Rule 1118 staff report listed several possible alternatives of minimizing flare emissions that could be incorporated further explored:

- Optimization of turnaround schedules
Coordination of turnaround schedules for different units can result in minimizing emissions associated with these periodic maintenance activities.
- Developing startup and shutdown procedures that do not increase emissions
For certain units, it is possible to develop procedures that avoid flaring during shutdown and startup, such as using reduced loads, recycling feeds, better decontamination procedures, etc. Sometimes more time is necessary for a startup or shutdown, or physical modifications to achieve this purpose.

Several of these approaches are also applicable to other types of industries in minimizing these types of operations. For example, the installation of redundant equipment to increase reliability and the promotion of operator training for environmental awareness could help a particular facility in minimizing the number of start-ups and shutdowns within a given operational cycle.

PROPOSED METHOD OF CONTROL

Conduct analysis to identify improved operating procedures, that minimize or eliminate the emissions impacts in either start-up, shutdown or turnaround and develop rule amendments that could seek implementation of best management practices and/or additional hardware.

EMISSIONS REDUCTION

Implementation of the control measure is expected to result in emission reductions. The magnitude of these reductions cannot be readily quantified at this time.

RULE COMPLIANCE AND TEST METHODS

Compliance would be based on monitoring, recordkeeping, and reporting requirements that have been established in existing source specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST EFFECTIVENESS

Not Determined.

IMPLEMENTING AGENCY

The District has authority to establish procedures for the purpose of minimizing or eliminating emissions during equipment start-up, shutdown and turnaround.

REFERENCES

Final Staff Report, Proposed Amended Rule 1118 – Control of Emissions from Refinery Flares, October 2005.

APPLICATION OF ALL FEASIBLE MEASURES [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY:	ALL SOURCE CATEGORIES
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS
EMISSIONS (TONS/DAY):	NOT DETERMINED (SEE EMISSIONS REDUCTION SECTION)
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

Background

This control measure addresses the attainment of further emission reductions through the amendment of existing rules and regulations. In particular, existing regulations on VOC coatings and solvents would be targeted for further emission reductions as well as rules and regulations for other pollutants such as NO_x and SO_x.

Regulatory History

The California Clean Air Act (CCAA) requires districts to achieve and maintain state standards by the earliest practicable date and for extreme non-attainment areas, to include all feasible measures Health and Safety (H&S) Code (H&S §§40913, 40914, and 40920.5). The term “feasible” is defined in the 14 California Code of Regulations, section 15364, as a measure “capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.” The required use of best available retrofit control technology (BARCT) for existing stationary sources is one of the specified feasible measures. H&S Code §40440 (b)(1) requires AQMD to adopt rules requiring best available retrofit control technology for existing sources. H&S Code §40406 specifically defines BARCT as “...best available retrofit technology means an emission limitation that is based on the maximum degree of reduction achievable taking into account environmental, energy, and economic impacts by each class or category of source.”

Existing rules and regulations on VOC coatings and solvents as well as regulations for pollutants such as NO_x, SO_x and PM reflect current BARCT. However, BARCT is ever evolving as new BARCT becomes available that is feasible and cost-effective. Through this control measure, the District commits to the adoption and implementation of the new retrofit control technology standards.

CONTROL METHOD

AQMD will continue to review new emission limits introduced through federal, state or other local regulations to determine if AQMD regulations remain equivalent or more stringent than other regions. If not, a rulemaking process will be initiated to perform BARCT analysis with potential rule amendments if deemed appropriate. In addition, AQMD will continue to monitor technology advances in order to implement new BARCT where applicable.

PROPOSED METHOD OF CONTROL

Adopt and implement new retrofit technology control standards that are feasible and cost-effective as new BARCT standards become available in the future.

EMISSIONS REDUCTION

Further emission reductions would be sought from the amendment of existing rules and regulations to reflect new BARCT standards, but may become available in the future. This control measure would act as an intermediary control measure between now and 2020 to achieve further emission reductions on a faster timeline than long-term control measures calling for further emission reductions from the amendment of existing rules and regulations starting in 2020.

RULE COMPLIANCE AND TEST METHODS

Compliance with this measure would be based on monitoring, recordkeeping, and reporting requirements that have been established in existing source specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST EFFECTIVENESS

Cost-effectives for this control measure cannot be determined because “all feasible” measures are not known. However, the most cost-effective control strategy using the newest control technologies would be sought. The District will continue to analyze the potential cost impact associated with implementing this control measure, conduct research on the newest control technologies, and provide cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from stationary sources.

REFERENCES

40 CFR Part 51.858.

Health and Safety (H&S) Code: §§40913, 40914, 40920.5, §40406, and §40440 (b)(1)

14 California Code of Regulations, section 15364

GROUP 6

Compliance Flexibility Programs

ECONOMIC INCENTIVE PROGRAMS [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY:	ALL SOURCE CATEGORIES
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS
EMISSIONS (TONDS/DAY):	NOT DETERMINED
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

This control measure is designed to enhance the District's existing regulatory programs to maximize compliance flexibility, minimize compliance costs, and to promote the commercialization of advanced pollution control technologies. In concept, this control measure proposes to expand the existing trading market to allow broader trading of mobile and stationary source emission credits, develop pilot credit trading rules between mobile and stationary sources including potential credits for new source review, develop clean air investment funds and other market incentive approaches.

Background

In April 1995 the District conducted the Intercredit Trading Study to assess the existing market-based regulatory programs and to identify potential enhancements for cost-effective air quality solutions. After a series of public workshops and public meetings the District staff presented a white paper titled, "Intercredit Trading Study - Proposed Recommendations and Action Plan" to its Governing Board in March 1996. This paper identified specific enhancements to the existing regulatory program that would provide additional compliance flexibility while promoting the commercialization of advanced pollution control technologies.

The 1997 AQMP included control measure FLX-01 formerly titled, "Intercredit Trading." The 1997 AQMP control measure was based on recommendations from the Intercredit Trading Study white paper and presented concepts for developing a universal trading market with stationary and mobile sources.

Over the past decade, the District has adopted a series of programs that incorporate a variety of different market incentive approaches such as emissions trading programs, mitigation fee programs, clean air investment programs, and averaging. Staff will continue to work collaboratively with EPA, ARB, industry and other interested parties to expand trading programs and address issues related to economic growth and compliance flexibility.

Emissions Trading Programs

Emissions trading programs include programs where emissions trading credits are generated by one source and used by another. Emission reduction credits are used in a variety of AQMD

programs. Under Regulation XIII – New Source Review, emission reduction credits (ERCs) are used to offset emission increase from new and modified sources. Some Regulation XI – Source Specific Rules, Regulation XX – RECLAIM and Rule 2202 allow the use of mobile source emission reduction credits (MSERCs) as a compliance alternative. MSERCs must be generated pursuant to an approved emission reduction protocol.

Mitigation Fee Programs

The concept of the mitigation fee program is to allow sources to pay a specified dollar per pollutant fee in lieu of directly complying with an emission limit. The fee would be used to generate emission reductions. The use of a mitigation fee approach was introduced in Rule 1121 – Residential Gas-Fired Water Heaters. Under Rule 1121, water heater manufacturers can pay a mitigation fee of \$2.70 per pound NO_x emission reductions that can be used in lieu of directly complying with the NO_x emission limits. The mitigation fee under Rule 1121 is temporary, and is allowed as an alternative to complying with an interim NO_x emission limit. Similar approaches may be considered in future rulemaking to provide certain compliance flexibility and to facilitate the adoption of technology-forcing limits. The mitigation fee concept has also been incorporated into Rule 1118 – Control of Emissions from Refinery Flares and Rule 1173 – Control of Volatile Organic Compound Leaks and Releases from Components of Petroleum Facilities and Chemical Plants, providing additional disincentives against releases from flares and pressure release devices at refineries and chemical plants.

Air Quality Investment Programs

The concept of the Air Quality Investment Program (AQIP) is based on sources paying a fee to the AQMD that is used to fund emission reduction projects. The District is responsible for obtaining emission reductions.

The AQMD has three types of air quality investment programs, under Rule 2202 - On-Road Motor Vehicle Mitigation Options and Rule 2020 – RECLAIM Reserve and Rule 1309.1. Under Rule 2202, facilities have the option to pay into an AQIP to purchase emission reductions to meet specified ridesharing requirements. The Rule 2202 AQIP has funded a variety of mobile source emission reduction control strategies from on-road vehicles, off-road vehicles, and marine vessels. To date, the Rule 2202 AQIP has generated 2,882 tons of NO_x, 16,991 tons of CO, and 2,846 tons of VOC emission reductions.

In response to the energy crisis of 2001/2002, the AQMD amended Rule 1309.1 – Priority Reserve to open up new source review emission reduction credits to electric generation facilities for expansion and growth. Operators of electric generation facilities were required to pay into a mitigation fee program which was then used to fund projects that mitigated the emission increases resulting from the expansion or growth.

The Rule 2020 AQIP was a temporary AQIP of NO_x emission reductions for RECLAIM facilities that met specific participation requirements. Provided there were NO_x emission reductions available, certain RECLAIM facilities could pay \$7.50 per pound of NO_x to meet their annual allocation requirements. The Rule 2020 AQIP relied on mobile source emission reduction protocols under the pilot credit generation programs of Regulation XVI.

Other Market Incentive Approaches

Other types of market incentive approaches include averaging and banking. The concept of emissions averaging is based on averaging emissions to meet an overall emission limit. Rule 1113 – Architectural Coatings includes a provision that allows manufacturers’ to average emissions from different coatings to comply with an overall emission limit. The concept of banking is based on saving emission credits generated in one year for use in another year. EPA has included an averaging and banking approach as an alternative to complying with emission limits for marine vessel standards under 40 CFR Part 94. The averaging provision allows engine manufacturers to certify one or more engine families above the applicable emission standard provided the emissions increase is offset by one or more families certified below the emission standard. The banking provision allows engine manufacturers to generate emission credits to bank for their future compliance use or another manufacturers’ use.

Regulatory History

In 2001, the AQMD adopted six mobile and area source pilot credit generation rules: Rule 1612.1 – Mobile Source Credit Generation Pilot Program; Rule 1631 – Pilot Credit Generation Program for Marine Vessels; Rule 1632 – Pilot Credit Generation Program for Hotelling Operations; Rule 1633 – Pilot Credit Generation Program for Truck/Trailer Refrigeration Units; Rule 1634 – Pilot Credit Generation Program for Truck Stops; and Rule 2507 – Pilot Credit Generation Program for Agricultural Pumps. NO_x emission reductions generated from these pilot credit generation rules could be used in the RECLAIM program either directly or through the RECLAIM Reserve for the Mitigation Fee Program for power producing facilities or the Rule 2020 AQIP for specific RECLAIM facilities. The six pilot credit generation rules, Rules 1612.1, 1631, 1632, 1633, 1634, and 2507 have been approved by CARB and EPA. However, because of sunset provisions in each rule, all pilot credit generation rules have now expired and can no longer be used to generate MSERCs.

Economic Incentive Guidelines

In January 2001, the EPA finalized their guidance document for “Improving Air Quality with Economic Incentive Programs” (EIP). The EIP is designed to encourage cost-effective innovative approaches to achieving air pollution goals. The guidance document outlines economic incentive programs that states and local areas may incorporate in their State Implementation Plans for meeting air quality standards.

The EIP outlines four main types of economic programs: emissions trading programs, financial mechanism programs, clean air investment funds, and public information. The EIP also outlines key principles that must be incorporated in an economic incentive program to receive EPA approval such as the integrity of emission reduction credits, protection of health and welfare from use of emission credits, and assurance of an environmental benefit.

Federal Clean Air Act

Since 1970, the federal Clean Air Act has required that states adopt regulations designed to attain ambient air quality standards. The Act generally has allowed the states to choose the appropriate type and mix of control strategies used to achieve attainment. In 1977 and 1990

Congress amended the Act to specify certain emission control requirements that each state regulatory program must impose. Nevertheless, the basic concept that states may choose the appropriate type and mix of control strategies has been retained as long as the specific control requirements of the Act are met (Sections 110, 172, and 182). Thus in general, the federal Clean Air Act does not prohibit the AQMD from expanding or linking emissions trading programs.

EPA has promulgated rules for economic incentive programs (EIPs) which either may or must be adopted by States for certain ozone and carbon monoxide nonattainment areas upon the failure of States to submit an adequate showing that an applicable reasonable further progress (RFP) milestone has been met pursuant to CAA Section 182(g)(3) and (5). These rules require that EIPs be submitted to the EPA for approval as part of the SIP and that they contain provisions to ensure the following: (1) the program will not interfere with other CAA requirements; (2) emission reductions credited are quantifiable; (3) creditable emission reductions are consistent with SIP attainment and RFP demonstrations; (4) reductions are surplus to reductions required by, and credited to, other SIP provisions in order to avoid double-counting of reductions; (5) the program is enforceable by State and Federal authorities; and (6) all creditable emission reductions are permanent. (See 40 Code of Federal Regulation (CFR) Sections 51.490 to 51.494 and 59 Federal Regulation (FR) 16690 et seq., April 7, 1994).

One approach where the U.S. EPA allows emission reductions from voluntary mobile source retrofit program to claim SIP credits is with the Voluntary Mobile Source Emission Reduction Policy (VMEP). Under this policy, states are allowed to claim, in their SIPs, up to three percent of the reductions necessary to meet their air quality goals from voluntary mobile source emission reduction programs. Emission reductions from retrofit programs of highway vehicles can also be used in transportation conformity analysis if the reductions are not included in the SIP.

PROPOSED METHOD OF CONTROL

This control measure is a voluntary program to provide additional compliance flexibility to regulated sources in the Basin, provide incentives for the early installation and commercialization of advanced pollution control technologies, and lower overall compliance costs. All existing economic incentive programs discussed in the previous section may be used to further the clean air objectives. The District will continue to evaluate source categories and strategies for future pilot credit generation programs and the potential to expand the program to generate alternative short-term offsets or credits for NSR purposes. In conjunction with other measures, this measure may also use fees collected from other market incentive programs to create a ‘Moyer’-type stationary program to incentivize early implementation of control technologies. Furthermore, within the District’s programs (e.g., Regulation III) a fee schedule based on the VOC content or emission rate may be explored. The District is currently working on an architectural coating fee program to recover the costs regulating this industry. The proposed concept is under review.

EMISSIONS REDUCTION

Due to the voluntary nature of this control measure, potential emission reductions associated with the early introduction of advanced pollution control technologies cannot be quantified.

Implementation of compliance flexibility program would not necessarily result in direct emission reductions since emission reductions associated with credit generation activities would be offset by the use of the emission credits. However, emission fee programs may generate reductions that are otherwise not allowable through traditional regulation programs. Innovative offset program encourage new sources employing the best available control technologies that cleaner than retrofit technologies. These emission benefits can only be claimed retrospectively through SIP revisions.

RULE COMPLIANCE AND TEST METHODS

Compliance with the provisions of this control measure would be based on monitoring, recordkeeping, and reporting requirements that have been established in existing source specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements. Recently, U.S. EPA provided some guidance on tracking and reporting reductions associated with voluntary programs. The District will work with U.S. EPA to incorporate necessary requirements for SIP crediting purposes.

Emissions quantification protocols will establish the appropriate test methods that applicable source categories will be required to use when generating and using emission credits under this program.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not been determined. Since this measure is voluntary, implementation of this control measure is expected to reduce the overall cost of compliance with District rules and regulations. Implementation of this control measure is expected to maximize trading opportunities and provide sources with more cost-effective compliance methods. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

The District has the authority to regulate stationary emissions sources such as refineries.

REFERENCES

South Coast Air Quality Management District. "Intercredit Trading Study. Proposed Recommendations and Action Plan." January 1996.

PETROLEUM REFINERY PILOT PROGRAM [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY:	EMISSION SOURCES IN THE SUBSUMED CONTROL MEASURES
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS
EMISSIONS (TONS/DAY):	NOT DETERMINED (SEE EMISSIONS REDUCTION SECTION)
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

Background

In the 2003 AQMP there was a recommendation to provide more flexibility to existing stationary source rules by allowing sources to achieve their reduction obligations by reducing emissions from on-site or off-site projects. A three-step process was proposed to implement this strategy. Step one would identify specific source categories and facilities or sources that would be subject to additional controls under any portion of this AQMP. Step two would include an identification of superior and more cost-effective strategies for one or more existing sources whose emissions occur within or otherwise impact the Basin. The final step would be to craft regulations which would offer facilities the flexibility to select from a menu of control options to comply with their emission reduction obligations as identified in the AQMP. The purpose of this program is to achieve emission reductions and environmental improvement in a less costly and more efficient manner and, through compliance flexibility, to minimize the economic and job-related impacts of the Plan and potentially to reduce the size of the black box.

The District initiated a collaborative multi-stakeholder process to consider whether to implement this approach as a pilot program for the refineries in the Basin. This process has been on-going since the initial July 2005 Working Group meeting. Based on the results of this process, the District would consider adoption of a pilot program. An appropriate environmental review would be performed prior to adoption of any pilot program. If such a program is adopted, then upon achieving at least the equivalent reductions, the pilot program would subsume the short and intermediate term control measures and reduction obligations proposed in the 2007 AQMP for the refinery sector.

The implementation of this pilot program does not preclude future adjustments to the overall reduction targets established for this source category if warranted by attainment demonstrations or industry changes in future SIP revisions.

Regulatory History

Currently, the District has a number of source specific rules to reduce emissions from refinery operations. Refineries are also subject to Reg XIII when triggered. Further reductions are necessary from this industry to meet the PM_{2.5} and ozone air quality standards. This measure seeks an alternative means to achieve reduction obligations, including long-term reductions.

PROPOSED METHOD OF CONTROL

This control measure is a voluntary program to provide additional compliance flexibility to regulated sources in the Basin. Refineries may seek reduction opportunities either from on-site or off-site sources. Reductions need to be quantifiable, surplus, enforceable, and permanent.

EMISSIONS REDUCTION

Not Determined

RULE COMPLIANCE AND TEST METHODS

Compliance with the provisions of this control measure would be based on monitoring, recordkeeping, and reporting requirements that have been established in existing source specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not yet been determined. Since this measure is voluntary, implementation of this control measure is expected to reduce the overall cost of compliance with District rules and regulations. Implementation of this control measure is expected to provide sources with more cost-effective compliance methods. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

The District has authority to regulate fugitive VOC emissions sources.

REFERENCES

2003 AQMP, Chapter 4 AQMP Control Strategy, pp. 4-46 to 4-47 “Add Flexibility to Current Programs”.

GROUP 7

Emission Growth Management

**EMISSION REDUCTIONS FROM
NEW OR REDEVELOPMENT PROJECTS
[NO_x, VOC, AND PM_{2.5}]**

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	NEW OR REDEVELOPMENT PROJECTS		
CONTROL METHODS:	APPROACHES UNDER REVIEW: SJVUAPCD; NEW DEVELOPMENT PROJECT THRESHOLDS; ENHANCED CEQA		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	2002	2014	2020
NO _x INVENTORY	115.9	56.5	28.4
NO _x REDUCTION		<u>0.0</u>	<u>1.0</u>
NO _x REMAINING		56.5	27.4
SUMMER PLANNING INVENTORY	2002	2014	2020
NO _x INVENTORY	114.2	55.4	27.6
NO _x REDUCTION		<u>0.0</u>	<u>1.0</u>
NO _x REMAINING		55.4	26.6
ANNUAL AVERAGE	2002	2014	2020
VOC INVENTORY	64.8	30.9	30.4
VOC REDUCTION		<u>0.0</u>	<u>0.5</u>
VOC REMAINING		30.9	29.9
SUMMER PLANNING INVENTORY	2002	2014	2020
VOC INVENTORY	72.9	34.7	34.6
VOC REDUCTION		<u>0.0</u>	<u>0.6</u>
VOC REMAINING		34.7	34.0
ANNUAL AVERAGE	2002	2014	2020
PM _{2.5} INVENTORY	10.5	8.7	7.8
PM _{2.5} REDUCTION		<u>0.0</u>	<u>0.5</u>
PM _{2.5} REMAINING		8.7	7.3
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	AQMD, LOCAL AGENCIES		

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to mitigate emission growth from new development and redevelopment projects. This initiative is designed to reduce emissions related to new residential, commercial, industrial and institutional development, including redevelopment, required to meet the needs of the Basin's future residents and economy. Lead agencies for projects subject to California Environmental Quality Act (CEQA) currently prepare air quality analysis as part of their environmental documents, including emissions during construction and operations. Typical emissions during construction phase include, but are not limited to: fugitive dust emissions, combustion emissions from off-road mobile sources (construction equipment) and on-road mobile sources, and coating and asphalt evaporative emissions. Operational emissions include, but are not limited to: area sources (e.g., water heater emissions), on-road mobile source emissions (worker commute trips, delivery truck trips, etc.), consumer products and other emissions sources depending on the specific type of land use. The purpose of this proposed measure is two-fold: (1) compliance with the "all feasible measures" requirement of the state law, and (2) capturing emission reduction opportunities during project development phase.

Background

New development projects produce new sources of air pollution from new vehicle trips, use of consumer products, landscape maintenance, new stationary source processes such as fuel combustion, as well as emissions generated during construction activities. Each day millions of vehicles travel the roads in the South Coast Air Basin and the length of vehicle trips is expected to increase as outlying areas continue to be developed. In addition, older residential, commercial and industrial areas may undergo major redevelopment involving construction activities, with emissions comparable to new development projects. Redevelopment projects may also generate additional vehicular traffic compared to the projects they replace because redevelopment projects often involve increasing population density compared to the previous use. Redevelopment includes demolishing existing buildings, increasing overall floor area or building additional capacity on an existing property. For example, the conversion of an industrial warehouse to an office building could create as much emissions as constructing a new building because it would be a complete remodel.

Regulatory History

California Health and Safety Code Section 40716 states that "a district may adopt and implement regulations to reduce or mitigate emissions from indirect and areawide sources of air pollution". Furthermore, a 1993 California Attorney General opinion states that "a district's regulations may require the developer of an indirect source to submit the plans to the district for review and comment prior to the issuance of a permit for construction by a city or county. A district may also require the owner of an indirect source to adopt reasonable post-construction measures to mitigate particular indirect effects of the facility's operation. Such regulations could be enforced through an action for civil penalties..." H & S Code 40716 also states that the authority of a district to "reduce or mitigate emissions from indirect and areawide sources of

air pollution (does not) ...constitute an infringement on the existing authority of counties and cities to plan or control land use.”

Health and Safety Code 42311(g) allows districts to adopt a schedule of fees on areawide or indirect sources which are regulated, but for which permits are not issued, to cover the costs of District programs related to this source.

San Joaquin Valley Unified Air Pollution Control District’s (SJVUAPCD) Rule 9510 – Indirect Source Review, recently adopted on December 15, 2005, requires new development projects to submit an Air Impact Assessment application to the District prior to obtaining discretionary approval for a building permit. Developers are required to implement mitigation measures to reduce PM10 and NOx emissions or, as an alternative, may pay into a mitigation fund for SJVUAPCD sponsored emission reducing off-site projects. The rule applies to certain specified industrial, commercial, and residential projects based upon the amount of build-out upon project completion. Specifically, the rule applies to projects which include any of the following: 50 residential units; 2,000 square feet (sq. ft.) of commercial space; 25,000 sq. ft. of light industrial space; 100,000 sq. ft. of heavy industrial space; 20,000 sq. ft. of medical office space; 39,000 sq. ft. of general office space; 9,000 sq. ft. of educational space; 10,000 sq. ft. of government space; 20,000 sq. ft. of recreational space; and 9,000 sq. ft. of space not identified. It also includes transportation projects whose construction exhaust emissions will result in a total of two tons per year of NOx and PM10 combined. The rule is designed to reduce the impact of development projects to the extent needed to allow SJVUAPCD to reach attainment of ozone and PM10 standards.

PROPOSED METHOD OF CONTROL

The AQMD is obligated by law to consider all feasible control measures which would include a measure that is considered equivalent to the SJVUAPCD’s Rule 9510. Several different approaches are currently under consideration for this control measure. The District will convene a working group involving stakeholders from the industry, local governments, and the community representatives to further explore these approaches or others to achieve reduction targets. As part of the program development process, consideration will also be given that the program requirements would not interfere with potential third party funding opportunities. Currently the approaches under consideration are:

SJVUAPCD Approach: SJVUAPCD’s Rule 9510 will be evaluated through the working group process to determine if a similar program can be developed to meet the local need or other equivalent approach to meet the state law requirements.

New Development Project Threshold Approach: Under this concept, the AQMD would develop a rule to establish emission thresholds (or other equivalent parameters) for new development and redevelopment projects. Projects exceeding these thresholds would be required to implement a series of mitigation measures. The quantity and the source of emission will be taken into consideration in developing the thresholds and mitigation measures to be implemented. Fee options in lieu of mitigation measures would be explored or could be required to offset the

residual emissions above the thresholds. The collected fees will fund emission reduction projects within the impacted community, to the extent feasible.

CEQA Approach: The CEQA approach contains three components.

Improved Documentation of CEQA Mitigation Measures - AQMD will expand, organize, and further document its CEQA mitigation measures for residential, commercial, and industrial development projects. The documentation is intended to provide sufficient records regarding the feasibility of such measures. The most feasible control methods are those that have been achieved in practice and found to have quantifiable emissions, such as construction dust control measures, alternative-fuel or low-emitting engines for construction equipment, diesel PM filters, and energy conservation measures. These mitigation measures will serve as a useful technical resource for developers and lead agencies to evaluate and incorporate adequate reduction strategies to mitigate significant impacts under CEQA.

Enhanced CEQA Review –The AQMD will enhance its review of CEQA documents prepared by other public agencies, which is referred to as intergovernmental review (IGR). The AQMD's IGR responsibilities specifically involve reviewing the air quality analysis in a CEQA document prepared by other public agencies (referred to as lead agencies) to ensure that the analysis methodologies, emission factors, analysis assumptions, etc., are consistent with the methodologies identified in the AQMD's CEQA Air Quality Handbook and on the AQMD's CEQA web pages. Staff will review the documents to ensure that the most recently approved models such as EMFAC2002 (EMFAC2007 once released), URBEMIS2002, etc., are used appropriately to estimate air quality impacts. The AQMD also reviews CEQA documents to determine if all feasible mitigation measures identified by the District are incorporated into the proposed project to reduce significant air quality impacts below the significance thresholds or to the maximum extent feasible. Staff will submit a comment letter based on the finding to the lead agency to recommend additional mitigation measures if necessary. Lead agencies – namely, the cities and counties making ultimate land use approval decisions under CEQA – would apply the updated and expanded guidance and mitigation recommendations to individual projects; determine the reasonably feasible emission reduction mitigation requirements and, thus, the conditions of approval; and monitor and enforce implementation of the mitigation measures.

CEQA Mitigation Fee Program - AQMD may establish a CEQA mitigation fee program in which mitigation fees may be paid for residual emissions above the significance thresholds after mitigation. All feasible mitigation measures required under CEQA have to be incorporated before the developers or local agencies can participate in the mitigation fee program. Participation in this program will be voluntary. AQMD will invest the mitigation funds on emission reduction projects within the impacted community, to the extent feasible, to minimize the impacts.

AQMD would form and coordinate a working group of lead agencies, local governments, and stakeholders to carry out this initiative, resolve issues, prepare guidance, and overcome implementation barriers. AQMD would issue updated guidance to lead agencies and project

sponsors on the full range of mitigation measures and best available control technologies available to new development in its CEQA Air Quality Handbook.

EMISSIONS REDUCTION

The precise emissions inventory for future new or development projects within the Basin cannot be determined at this time. However, based on the emission growth projected for this region, a reduction target of 0.5 tpd of VOC, 1 tpd of NO_x, and 0.5 tpd of PM_{2.5} is established for 2020. The reduction estimates will be further refined through future AQMP updates.

RULE COMPLIANCE

Depending on the approach taken, AQMD will adopt a rule, program or policy to implement this measure.

TEST METHODS

Approved emission quantification protocols by federal, state or local agencies will be used to track and report emission reductions for SIP purposes.

COST EFFECTIVENESS

The cost effectiveness of this control measure would vary depending on the mitigation measures selected by the developers or lead agencies. If a mitigation fee program is to be established, the fee schedule to be established for the mitigation program will be based on the control options available at the time of program development.

IMPLEMENTING AGENCY

The District has the authority to implement this measure under its indirect source authority in conjunction with local lead agencies.

**EMISSION BUDGET AND MITIGATION
FOR GENERAL CONFORMITY PROJECTS
[ALL POLLUTANTS]**

CONTROL MEASURE SUMMARY

SOURCE CATEGORY:	ALL SOURCES CATEGORIES
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS
EMISSIONS (TONS/DAY):	NOT DETERMINED (SEE EMISSIONS REDUCTION SECTION)
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

Background

A General Conformity determination is required by the federal Clean Air Act (CAA) for federal actions. These actions include airport expansion like those proposed for LAX and major projects that receive federal funding. In addition, approval of federally funded transportation plans, programs, and projects are covered by the Transportation Conformity requirements of the Clean Air Act.)

The requirements for General Conformity are contained in section 176(c)(1) of the CAA and in the General Conformity regulations promulgated by EPA in 1993 (40 CFR Part 51, Subpart W, and 40 CFR Part 93). In general, federal actions must support the goals of the State Implementation Plan (SIP) and be shown to not:

- * Cause or contribute to new violations of any standard;
- * Increase the frequency or severity of any existing violations;
- * Interfere with the timely attainment or maintenance of any standard
- * Delay emission reduction milestones; or
- * Contradict SIP requirements.

The General Conformity regulations apply to nonattainment areas where the estimated emissions from the action meet or exceed specified emission rates for each NAAQ.

One of the criteria for determining conformity for ozone nonattainment areas (40 CFR Part 51.858) is for the District to make a determination that the total of the direct and indirect emissions from the General Conformity project does not exceed the emission budget in the SIP.

In each of the past several years, the District has been asked to review one to several projects relative to General Conformity. These are generally very large projects and it is not always possible for the emissions to be offset. In this case, District staff must make a General Conformity determination that involves examining each emission category for each of the pollutants that are above the specific applicable thresholds in the General Conformity regulations. This control measure will reduce the potential uncertainty in determining whether emissions from specific projects are definitively included in projected growth for future years, by establishing a specific budget for projects not specifically included in the Plan and emission budgets, and setting up a Mitigation Fee Program for situations that exceed these budgets.

PROPOSED METHOD OF CONTROL

In order to provide clear General Conformity budgets in the SIP, the District proposes the following approach:

- Establish a percentage of remaining emissions from each source category in the 2007 AQMP for each milestone year will be set aside as emission budgets for projects subject to general conformity, unless certain emissions are explicitly identified in the plan for such purpose;
- Emission budgets are on a first-come-first-serve basis and the District will track all consumption as part of its NEPA review process;
- If project emissions exceeded the budgets for the source category, the portion of emissions exceeding the budgets needs to be fully offset/mitigated;
- If the mitigation measures are not sufficient to offset the emissions, the AQMD Board will make a finding of overall air quality benefit and allow mitigation fees in lieu of reductions;
- The District will use the fees to invest in emission reduction projects within the affected community, to the extent feasible;
- Surplus reductions to the SIP commitments due to CARB or District regulatory actions can be used as additional budgets for the duration such reductions remain surplus.

Mitigation Fee Program

The concept of the mitigation fee program proposed in this measure is to allow sources to pay a specified dollar per pollutant fee to mitigate residual emissions after all reasonably available mitigation measures are implemented. The AQMD will establish fees per unit of pollutant equivalent to costs of potential emission reduction projects necessary to offset the emission impact. Appropriate protocols will be established to quantify and verify emission reductions.

EMISSIONS REDUCTION

Emission reductions would be sought in order to mitigate emission increases from general conformity projects that have exceeded the budgets for the source category. Surplus emission reductions achieved, if any, will be incorporated into the SIP inventories through Plan revisions

RULE COMPLIANCE AND TEST METHODS

Compliance with the mitigation measures would be based on monitoring, recordkeeping, and reporting requirements that have been established in existing source-specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST EFFECTIVENESS

Cost-effectives for this measure cannot be determined because the mitigation measures and the emission reductions resulting from mitigation fees are not known at this time. However, for both situations the most cost-effective control strategy would be sought. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

The District has authority to establish an emission budget, assess mitigation measures, and seek emission reductions through the use of mitigation fees.

REFERENCES

40 CFR Part 51.858.

**EMISSIONS MITIGATION
AT FEDERALLY PERMITTED PROJECTS
[ALL POLLUTANTS]**

CONTROL MEASURE SUMMARY

SOURCE CATEGORY:	ALL SOURCES CATEGORIES
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS
EMISSIONS (TONS/DAY):	NOT DETERMINED (SEE EMISSIONS REDUCTION SECTION)
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

Background

This control measure addresses mitigation measures for Federally permitted projects impacting the District. This need for mitigation was the result of a recently proposed project.

For example, a liquefied natural gas facility has been proposed in federal waters offshore of Ventura County. The project is subject to the Deepwater Port Act, and must obtain an air permit from the EPA. While the offshore activity is within Ventura County, the Basin is downwind and will be directly impacted by the proposed project. Although the onshore pipeline to be constructed within the jurisdiction of AQMD is addressed through CEQA, there is a concern about the quality of natural gas as this could significantly affect the AQMD's progress towards achieving air quality goals in the air Basin (See Control Measure CMB-04).

Regulatory History

See Control Measure 2007 AQMP CMB-04 Natural Gas Fuel Specifications

PROPOSED METHOD OF CONTROL

The proposed method of control would depend upon the emissions generated from the Federally permitted projects. However, it is expected that the control method would rely upon commercially available technologies.

Possible mitigation scenarios include:

- Call for EPA to adopt measures to mitigate stationary source emission increases in SCAB due to its permitting actions
- If EPA cannot mitigate emission increases through its regulatory actions provide mitigation fees to AQMD as described in Control Measure EGM-02

- If EPA is not willing to do either of these abovementioned approaches, the basin sources would need to offset such increases (see Control Measure LTM-03).

EMISSIONS REDUCTION

Mitigation measures would be sought in order to reduce emissions generated from federally permitted projects.

RULE COMPLIANCE AND TEST METHODS

Compliance with the mitigation measures would be based on monitoring, recordkeeping, and reporting requirements that have been established in existing source specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST EFFECTIVENESS

Cost-effectives for this measure cannot be determined because the mitigation measures are not known. However, the most cost-effective control strategy would be sought. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide cost effectiveness information as it becomes available. For information purposes, the current Carl Moyer uses a cost effective criteria of \$14,300 per (NO_x + NO_G + 20 x PM) and the program has been over-subscribed.

IMPLEMENTING AGENCY

The District has authority to mitigation measures.

REFERENCES

40 CFR Part 51.858.

GROUP 8

District's Mobile Source Control Measures

MITIGATION FEE PROGRAM FOR FEDERAL SOURCES [NO_x]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY:	FEDERAL SOURCES (AIRCRAFT, SHIPS, TRAINS, OTHER PREEMPTED SOURCES)
CONTROL METHODS:	MITIGATION FEE PROGRAM
EMISSIONS (TONS/DAY):	NOT DETERMINED
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD, U.S. EPA; POSSIBLY REQUIRING ADDITIONAL LEGISLATION

DESCRIPTION OF SOURCE CATEGORY

Background

The primary authority for establishing emission standards for ships, aircraft, trains, and new off-road farm and construction equipment less than 175 horsepower (HP) is under federal jurisdiction. AQMD may adopt use or operational limitations for such sources. Emissions from these federal sources continue to represent a significant and increasing portion of the emissions inventory in the South Coast Air Basin. Current emission estimates for aircraft, marine vessels, and locomotives indicate that activity and emissions from these sources will substantially increase in future years. Without adequate controls of these sources, however, the emissions reduction burden would have to be unfairly shifted to other stationary and mobile sources that have been regulated for many years, seriously jeopardizing the attainment of the 8-hour ozone and PM_{2.5} standards may not be possible.

Regulatory History

Locomotive, Aircraft, and Ships

In 1998, U.S. EPA adopted regulations affecting all new or remanufactured locomotives after January 1, 2000. Specific emission standards found in 40CFR Part 92 depend on the date of manufacturer or remanufacture and the type of duty-cycle, but may go as low as 5.5 g/bhp-hr NO_x (Tier 2) and 0.2 g/bhp-hr PM (Tier 2) for line-haul locomotives manufactured on or after January 1, 2005. U.S. EPA is scheduled to propose new locomotive engine standards (Tier 3) by the end of 2006, for adoption sometime in 2007.

In addition, Measure M14 – National Emission Standards for Locomotives in the 1997 AQMP required low-emission locomotives to completely replace existing locomotives in the Basin by 2010. Control Measure #97M14 applied to all types of locomotives and assumed that U.S. EPA would develop a two-tiered national NO_x emission standard. In adopting measure M14, ARB assumed that by 2010, locomotive fleets in the Basin will be required to emit a fleet-wide average of no more than the U.S. EPA's established Tier 2 emission level. To this end, ARB staff developed a Memorandum of Mutual Understandings and Agreements (Memorandum)

with the California Railroads and the U.S. EPA that was signed in July 1998. The Memorandum includes provisions for early introduction of clean locomotives in the Basin, which will meet the fleet-wide average target by 2010. In addition to the 1998 Railroad MOU, the state entered into an agreement in 2005 with the two Class 1 Railroads operating in California to monitor and reduce their air pollution associated health risks at 17 rail yards in the state.

As part of its attainment strategy, AQMD has adopted three rules applicable to railroads, which will reduce certain pollutants and toxic effects of diesel PM. The International Maritime Organization (IMO) established NO_x standards in 1997 that apply to marine vessel engines over 130 kW installed on new vessels. IMO standards became effective in 2005 and applied to new ships manufactured on and after 2000. U.S. EPA adopted emission standards for commercial marine vessels in 1999 (40CFR Part 94). These standards primarily apply to commercial harbor craft since the large engines (i.e., 30 liters per cylinder) used by ocean-going ships are not covered by Part 94. However, the net emission benefit associated with the IMO requirements and EPA regulations are minimal because of their lack of stringency and the slow turnover rate of engines.

Aircraft emissions are regulated by the International Civil Aviation Organization (ICAO) and U.S. EPA. Current standards (HC, NO_x, smoke) are based on engine thrust and vary depending on the engine pressure ratio. These standards are not expected to achieve any significant reductions in future years because of their lack of stringency. Currently, military aircraft are exempt from these engine standards.

California SIP

The existing regulations on federal sources are not expected to result in significant emission reductions in future years. For the PM_{2.5} and 8-hour ozone attainment, additional reductions would be necessary from federally regulated sources. Without an assurance that U.S. EPA will identify and commit to additional regulations and considering the attainment deadlines of 2015 for PM_{2.5} and 2021 for ozone, the District is proposing this Control Measure to ensure federal sources contribute their fair share to achieving federal ambient air quality standards.

The District is currently seeking to obtain broader legal authority to regulate mobile sources to the extent feasible (e.g., retrofit controls, mitigation fees).

PROPOSED METHOD OF CONTROL

As an alternative to stringent national rules and to achieve a fair share reduction commitment by federal sources to address unique local needs, this control measure proposes a mitigation fee program for federal sources. The program is to be adopted by U.S. EPA and the mitigation fee to be paid by federal sources through EPA rulemaking and/or U.S. EPA grants to the District. The District will use the funds collected to solicit proposals from both federal and non-federal sources to achieve equivalent reductions for SIP purposes. Under this control measure, U.S. EPA would be responsible for reducing NO_x emissions from federal sources based on their emission contribution and the overall level of reductions needed for attainment. The estimated mitigation fee is assumed to be comparable to cost of mobile source NO_x control technologies.

The program would be similar to the District's Emission Mitigation Fee Program for Power Producing Facilities (Regulation XX - RECLAIM) initiated in 2002 and to the Carl Moyer Memorial Air Quality Standards Attainment Program. The RECLAIM Emission Mitigation Fee Program was a program where power producing facilities that exceed annual allocations and met specified applicability requirements in Rule 2004 pay a participation fee to the District for generation of NO_x emission reductions by the District to mitigate emission exceedances. The statewide Carl Moyer Memorial Air Quality Standards Attainment Program provides grants to offset the incremental cost of projects that reduce emissions of NO_x from covered sources in California.

The District could also seek additional legislative authority to impose mitigation fees on such sources. Emission fee rates imposed on federal sources will be established based on specific criteria, including but limited to: type of federal source, emissions inventory, potential reduction opportunities, control cost, and proximity to Environmental Justice (EJ) areas. In addition, a source specific metric for determining a common unit of activity measurements could be used as a basis for establishing the fee rate. In order to ensure that the fee rate is properly adjusted from year to year, a monitoring and reporting procedure would be implemented to indicate any changes in the activity measurements or emission rates that would affect the fee charged to federal sources. Collected fees would be transferred to a special account established for the purposes of funding emission-reduction projects so that program performance can be monitored.

Selection of particular projects to be funded by the Mitigation Fee Program for federal sources would have to adhere to an implementation protocol approved by the Governing Board. This protocol will be developed through selective participation and will include specific selection criteria, including but not limited to: quantifiable emission benefits, emission reduction potential, cost-effectiveness, and proximity to affected areas (e.g., EJ areas). Projects to be funded would have to be approved by the District's Governing Board.

It is also envisioned that this mitigation fee approach would also apply to regional projects that require federal approval (e.g., new port terminals, airport expansion). As part of the development of this control measure, the AQMD will evaluate the possibility of establishing a fee program for federally approvable projects where the emissions cannot be adequately mitigated. Fees would be levied on those excess emissions which could not be mitigated.

EMISSIONS REDUCTION

The 2020 baseline inventory for ships, aircraft, and trains is estimated to be approximately 160 tons of NO_x per day which is approximately 63 percent of the off-road mobile source inventory and 30 percent of the total NO_x inventory in the Basin. At this time, it is not possible to estimate any emission reductions from this control measure.

TEST METHODS

The appropriate test method(s) would depend on the specific NO_x emission reduction projects undertaken.

COST EFFECTIVENESS

Not Determined.

IMPLEMENTING AGENCY

The District has the authority under the Lewis Presley Air Quality Management Act to collect fees based on emissions. However, implementation of this control measure may require additional legislation unless implemented by U.S. EPA. U.S. EPA would appropriate funding or enable collection of monies in lieu of control. The District would then fund cost-effective reduction projects with the collected funds.

EXTENDED EXCHANGE PROGRAM [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY:	SMALL OFF-ROAD ENGINES (SORE) AND RECREATIONAL OUTBOARD ENGINES
CONTROL METHODS:	EXCHANGE EXISTING IN-USE SORE FOR ELECTRICAL EQUIPMENT, OR NEW LOW-EMITTING ENGINES
EMISSIONS (TONS/DAY)	SEE EMISSIONS REDUCTION SECTION
CONTROL COST:	THE COST-EFFECTIVENESS OF THIS CONTROL MEASURE WILL VARY DEPENDING ON THE TYPE OF EQUIPMENT BUT HAS RANGED FROM 800 \$/TON FOR LEAF BLOWERS TO 10,000 \$/TON FOR LAWN MOWER EQUIPMENT
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to promote accelerated turn-over of in-use small off-road engines (SORE) and other engines such as recreational outboard engines through expanded voluntary exchange programs.

Background

The small off-road engines (SORE) category consists of spark ignition engines run on gasoline or alternative fuel such as liquefied petroleum gas (LPG) or compressed natural gas (CNG), and are rated at below 25 horsepower (19 kW). The SORE equipment category includes handheld and non-handheld lawn and garden equipment such as string trimmers, leaf blowers, lawn mowers, generators, and lawn tractors, as well as other commercial/industrial equipment. This category does not include compression ignition engines or recreational vehicles. The vast majority of SORE equipment use gasoline.

Since 2003, the AQMD has sponsored lawn mower buy back programs for residential users of old lawn mowers. This program has resulted in 11,500 high polluting gasoline-powered lawn mowers taken out of service in 2003-2005, and 4,000 lawn mowers being exchanged in 2006. The program is designed so that an individual turns in their old lawn mower in exchange for paying \$100 towards a new electric-powered lawn mower. In addition to the lawn mower exchange program, the AQMD has recently sponsored a gasoline-powered leaf blower exchange program targeted at commercial operators. In this program, an individual turns in their old gasoline-powered two-stroke leaf blower in exchange for paying \$200 towards a new four-stroke gasoline-powered leaf blower certified to the CARB new engine emission standards. The new four-stroke units are less polluting than the two-cylinder units. The leaf blower buy back program has resulted in 1,500 leaf blowers being exchanged.

Regulatory History

Since September 2003, CARB has established emission standards (exhaust and evaporative) for new SORE engines. However, CARB regulations do not impact existing equipment. As part of its commitment in the 2003 AQMP, in September 2003, the CARB Board also directed CARB staff to conduct research for potential increase use of electric equipment for small off-road engines. In April 2004, CARB staff reported to the Board that there is a high possibility of increasing the penetration for electric engines through voluntary measures, incentive programs, and other consumer awareness programs.

PROPOSED METHOD OF CONTROL

In order to increase the penetration of electric equipment or new low emission gasoline-powered equipment, the AQMD is proposing to expand its existing lawn mower/leaf blower exchange program. This expansion will be accomplished by increasing the number of exchange events and available funding for these programs. In addition, other SORE equipment as well as recreational outboard engines used in pleasure craft may also be considered for exchange programs for accelerating the turnover of existing engines. In addition to the voluntary program primarily envisioned by the control measure, the AQMD will explore the potential of a mandatory turnover and replacement of older SORE.

EMISSIONS REDUCTION

This control measure promotes faster turnover rate of in-use engines to electric versions of the same equipment type or engines that meet the new low-emission standards. The expected emission reductions for this control measure would depend on the number and types of engines participating in the program. The expected annual emission reductions would be approximately 8 pounds VOC, 0.05 pounds NOx, and 26 pounds CO for each lawn mower replaced with an electric version; and 19 pounds VOC for each leaf blower replaced with an electric version. The estimates for other type of equipment targeted in an exchange program would vary and are not estimated for this control measure.

RULE COMPLIANCE AND TEST METHODS

Due to its voluntary nature, compliance with the provisions of this control measure is not established. However, the criteria used for participation in existing exchange programs would be carried over into an expanded program. The type of criteria used in the existing exchange programs includes proof of residence, actual equipment operation, and limiting exchanges to one per individual.

COST EFFECTIVENESS

The cost effectiveness will depend on the types of engines or equipment participating in the exchange program. In the District's leaf blower exchange program, low emission units were offered at a cost of \$200 instead of a typical retail price of \$460. The total cost of this program was \$225,000 funded through the District's Air Quality Investment Program (AQIP). The cost effectiveness of this leaf blower exchange program is reported to be \$800 per ton.

In the lawn mower exchange program, electric lawn mowers were offered at \$100 instead of at a typical retail price of \$285. The total cost of the exchange program for 4,000 lawn mowers in 2006 was \$856,000 funded through the District's AQIP. The cost effectiveness of this lawn mower exchange program is estimated to be \$9,840 per ton.

IMPLEMENTING AGENCY

The AQMD has successfully implemented voluntary exchange programs for leaf blowers and lawn mowers since 2003. The extended exchange program is expected to be implemented by AQMD.

REFERENCES

CARB - The 2003 State and Federal Strategy for the California State Implementation Plan, September 24-25, 2003.

CARB - Staff Report, Potential Electrification Programs for Small Off-Road Engines, April 2, 2004.

CARB - California Code of Regulation, Title 13, Division 3, Chapter 15, Article 1 – Evaporative Emission Requirements for Off-Road Equipment, September 2003.

CARB - Staff Report – Initial statement of reasons for proposed rulemaking public hearing to consider the adoption of exhaust and evaporative emission control requirements for small off-road equipment and engines less than or equal to 19 kilowatts, August 8, 2003.

SCAQMD - Governing Board March 3, 2006 Meeting, Agenda #5, Execute Contracts for Rule 2202 AQIP and the 2006 Lawnmower Exchange Program.

BACKSTOP MEASURES FOR INDIRECT SOURCES OF EMISSIONS FROM PORTS AND PORT-RELATED FACILITIES [NOX, SOX, PM]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	PORTS AND PORT-RELATED SOURCES (e.g., MARINE VESSELS, LOCOMOTIVES, TRUCKS, CARGO HANDLING EQUIPMENT, HARBOR CRAFT AND STATIONARY EQUIPMENT)		
CONTROL METHODS:	PORT AND PORT FACILITY EMISSION CONTROL PLANS, CONTRACTUAL REQUIREMENTS, RULES, TARIFFS AND INCENTIVES/DISINCENTIVES TO IMPLEMENT MEASURES INCLUDING: <ul style="list-style-type: none"> • AFTERTREATMENT FOR DIESEL EQUIPMENT • NON-DIESEL FUELED EQUIPMENT USING LNG, CNG, FUEL CELLS, ETC. • LOW SULFUR FUELS • EMULSIFIED DIESEL FUEL WITH DIESEL OXIDATION CONTROLS • ELECTRICITY-POWERED SYSTEMS INCLUDING SHORE POWER FOR MARINE VESSELS • INTERNAL ENGINE MODIFICATIONS • RETROFIT AND REPLACEMENT OF IN-USE EQUIPMENT • ALTERNATIVE TECHNOLOGY STRATEGIES SUCH AS BATTERY DOMINANT HYBRID SYSTEM • VESSEL SPEED REDUCTION 		
EMISSIONS (TONS/DAY):	TO BE DETERMINED		
ANNUAL AVERAGE	2002	2014	2020
NOX INVENTORY	TBD	TBD	TBD
NOX REDUCTION		TBD	TBD
NOX REMAINING		TBD	TBD
SUMMER PLANNING INVENTORY	2002	2014	2020
NOX INVENTORY	TBD	TBD	TBD
NOX REDUCTION		TBD	TBD
NOX REMAINING		TBD	TBD
ANNUAL AVERAGE	2002	2014	2020
SOX INVENTORY	TBD	TBD	TBD
SOX REDUCTION		TBD	TBD
SOX REMAINING		TBD	TBD

ANNUAL AVERAGE	2002	2014	2020
PM INVENTORY	TBD	TBD	TBD
PM REDUCTION		TBD	TBD
PM REMAINING		TBD	TBD
CONTROL COST: TO BE DETERMINED			
IMPLEMENTING AGENCY: SCAQMD			

DESCRIPTION OF SOURCE CATEGORY

Background

The ports of Los Angeles and Long Beach are the largest in the nation in terms of container throughput, and collectively are the single largest fixed sources of air pollution in Southern California. Emissions from port-related sources, such as marine vessels, locomotives, trucks, harbor craft and cargo handling equipment, adversely affect air quality in the local port area as well as regionally. Collectively, port-related sources create more than 100 tons per day of smog- and particulate-forming nitrogen oxides – more than the emissions from all 6 million cars in the region. Port sources also release approximately 25% of diesel particulate matter emitted in the SCAB, and marine vessels alone emit 44% of regional SO_x — a precursor to particulates. Marine vessels are also virtually the only significant source category with emissions projected to increase in coming years. This is due to substantial increases in projected cargo throughput, and the relative laxity of current emissions standards for these sources. Without substantial control of emissions from port-related sources, it will not be possible for this region to attain federal ambient air quality standards for ozone or PM_{2.5}. Port sources also contribute to cancer risks. The California Air Resources Board estimates that cancer risks caused by sources in the ports exceed 500 in 1 million for over 50,000 residents near the ports. Many more persons are affected at lower levels of risk.

In January 2006, the AQMD Board approved the Chairman's Clean Port Initiative, including several action items to control criteria pollutant emissions and cancer risks from ports and port-related facilities. Recognizing the unique legal authorities and expertise of the ports relating to operations on lands they control, the chairman's initiative called for the ports to take sufficient and coordinated actions to control emissions. At the time the initiative was announced, the ports had never cooperated to establish a coordinated, comprehensive plan to control air pollution. The initiative also called for a summit meeting between the presidents of the harbor commissions and the AQMD board chair, which occurred in March 2006. Following that meeting, the staffs of the two ports met, with participation by AQMD, CARB and EPA, and developed a draft *San Pedro Bay Ports Clean Air Action Plan* (CAAP). The plan proposes to utilize the authorities of the ports, including powers to establish lease conditions, port rules, tariffs and incentives, to implement emission control strategies. As of the date of this draft AQMP, the CAAP is undergoing revision in response to public comments, with consideration by the harbor commissions expected in November 2006.

The Chairman's initiative also called for AQMD to develop and adopt "backstop" rules that would take effect if the ports did not take actions that, in conjunction with standards adopted by CARB, EPA, AQMD and the International Maritime Organization, would achieve sufficient, timely emission reductions. The goals of the backstop rules would be to (1) achieve reductions in emission from port-related sources to levels needed for attainment of ambient air quality standards, consistent with the AQMP, (2) reduce health risks from toxics to acceptable levels, and (3) prevent increases in health risks and criteria pollutant emissions from port projects

This AQMP measure is intended to achieve the goals described above. This measure is fashioned as a "backstop" so as to allow the ports discretion regarding the manner in which emissions and risks are controlled, and regarding the implementing tools that will be used (e.g. environmental lease conditions, port rules, tariffs or incentives), as long as performance goals are met. A key element of this measure—the criteria pollutant emission reduction goals—is taken from the AQMP attainment analysis. Based on computer modeling and other analyses conducted for the AQMP, the AQMD staff has quantified the emission reductions needed from port-related sources to attain the federal 8-hour ozone and PM_{2.5} ambient air quality standards. These emission reduction amounts will be incorporated into AQMD backstop rules implementing this measure, with a goal of assuring that such reductions timely occur. In addition, the district expects to seek SIP credit for such reductions.

Regulatory History

Emissions from sources associated with the ports—marine vessels, harbor craft, cargo handling equipment, locomotives, and trucks—have historically been regulated primarily by international, federal or state authorities. The International Maritime Organization (IMO), an agency of the United Nations, has established NO_x emissions limitations and fuel sulfur specifications for oceangoing vessels; the federal Environmental Protection Agency (EPA) has adopted emission standards for new locomotives, new trucks and some vessels; and the California Air Resources Board (CARB) has adopted standards for new trucks and recently voted to adopt standards for cargo handling equipment and marine auxiliary engine fuels. Neither federal nor international law explicitly require EPA or IMO regulations to be sufficiently stringent to meet the needs of a particularly polluted region such as South Coast, and the rules adopted by those bodies have not met those needs.

Key regulatory and other actions taken to date are as follows:

- *International Maritime Organization Emissions and Fuel Standards.* IMO NO_x standards for new "Category 3" vessels (including the container vessels responsible for the greatest share of emissions from local ports) will achieve only a six percent reduction in emissions. IMO fuel rules allow extraordinarily high levels of sulfur content, up to 45,000 parts per million, and actual sulfur content for main engine fuels averages approximately 27,000 ppm.
- *EPA Marine Vessel Regulations.* The vast majority of oceangoing vessels calling on local ports are foreign flagged. Their emissions have not been regulated by EPA. EPA stated several years ago that it would consider adopting emission standards for foreign flag vessels in 2007, but there is no guarantee that it will do so, or that such standards will be adequate for

this region. EPA has stated that there is a question regarding its authority under the Clean Air Act to regulate foreign vessels.¹

- *EPA Emission Standards for Locomotives.* Under current EPA “Tier 2” regulations, the newest locomotives must achieve an approximate 57% reduction in NOx emissions. In 2004, EPA stated its intent to propose more stringent locomotive emission standards, but those regulations have been delayed and there is no assurance that such standards will be sufficient for this region to achieve healthful levels of particulates, ozone or toxics.
- *EPA and CARB Emission Standards For Trucks.* Adopted standards are stringent, but full benefits are many years away because the standards generally apply only to new units and trucks have long useful lives.
- *CARB Marine Auxiliary Engine and Cargo Handling Rules.* The majority of marine vessel emissions are created by main propulsion engines, but auxiliary engines emissions are important, in part because they occur at dock in closer proximity to persons in and around the port. In December 2005, the CARB Board voted to adopt fuel sulfur standards for marine auxiliary engines, including those on foreign flag vessels, in waters out to 24 nautical miles. The rule will limit fuel sulfur to 5,000 ppm, with the potential to require 1,000 ppm sulfur content by 2010 pending a technology and fuel availability review.² The rule has not completed all administrative review processes, and industry has filed arguments that CARB lacks the authority to adopt or enforce the rule against foreign flag vessels beyond California waters. The CARB Board also voted in December to adopt emission standards for cargo handling equipment such as yard tractors.
- *MOUs.* In 1998, CARB entered into an MOU with the Union Pacific and Burlington Northern Santa Fe railroads which established a fleet average emissions limit for locomotives operating in the South Coast Air Basin. The intended effect of this MOU is to accelerate introduction of Tier 2 locomotives (achieving an approximate 57% level of NOx control) in this region. In June 2005, CARB entered into a second MOU with the same two railroads that is intended to reduce health risks near railyards and is projected by CARB to achieve a 20% reduction in PM emissions. Finally, several years ago, the ports, shipping interests, and regulatory agencies entered into a MOU seeking voluntary reductions in vessel speed to reduce NOx emissions.
- *SCAQMD Rules Governing Locomotive Idling and Risk Assessment.* In 2005 and 2006, the District adopted rules requiring railroads to minimize unnecessary locomotive idling, and to develop emissions inventories and health risk assessments and notify the public of health risks.

¹ As stated by EPA, this is an issue of statutory authority under the Clean Air Act. 68 Fed.Reg. 9759 (February 28, 2003). This is not a question of authority of the United States to control emissions from foreign flag vessels. International law recognizes the authority of a nation to adopt environmental standards for vessels that enter the nation’s ports. *United Nations Convention on the Law of the Sea*, Art. 21.1; Art. 25.2 and Art. 211.3.

² AQMD believes that levels lower than 5,000ppm are feasible; the Danish shipping company MEARSK recently announce that it is using fuel with sulfur content of no more than 2,000 ppm in main and auxiliary engines within 24 miles of the California coast.

- *Funding Programs.* SCAQMD, CARB and EPA have funded numerous projects to reduce emissions from port-related sources.
- *CARB Emission Reduction Plan for Ports and Goods Movement.* This plan, adopted in April, 2006, includes a wide ranging set of proposed control strategies, designed to achieve an 85% reduction in risk from diesel particulate matter compared to risks in 2000, and to achieve specified reductions in criteria pollutant emissions. The measures in the plan are described in conceptual terms, and implementing agencies generally are not identified. The plan recognizes that action by local bodies (such as the ports through their lease agreements) is one potential means to implement its measures. CARB staff has also stated its intent to develop proposed rules during 2007 that would, among other things, limit fuel sulfur content for vessel main engines and require shore power for ships at dock.
- *Port Actions.* Both the ports of Los Angeles and Long Beach have developed emission control programs and plans that will help mitigate air quality impacts. (E.g. Port of Long Beach *Green Port Policy*,³ Port of Los Angeles *Clean Air Program*⁴). To date, however, port actions (along with the regulatory and other actions described above) have not arrested growth in port emissions. The draft *San Pedro Bay Ports Clean Air Action Plan* (CAAP) currently under development would substantially reduce emissions at a pace that, for some measures, is faster than proposed and adopted CARB measures. In addition, as noted earlier, the ports, as landlords to marine terminals and other facilities, have legal authority to require and incentivize controls in ways that regulatory agencies do not. There will not, however, be an enforceable obligation for the ports to implement the CAAP unless a mechanism such as the backstop rules envisioned by this measure are adopted.

PROPOSED METHOD OF CONTROL

The goal of this measure is to establish, and ensure achievement of, the following standards:

- *Port Standards.* Control emissions from port-related sources sufficiently to—
 - reduce year 2014 and 2020 emissions of NO_x, SO_x and PM to implement the AQMP strategy to attain federal PM_{2.5} and 8-hour ozone ambient air quality standards,
 - ensure interim progress by reducing year 2011 NO_x, SO_x and diesel PM emissions to 2001 levels,
 - by 2020, further control diesel PM sufficiently to reduce health risk from the ports by at least 85% compared to 2000 levels,
 - if necessary, continue progress to reduce cancer risk from diesel PM to a lower level to be determined through rulemaking.
- *Project Standards.* Assure that approvals of port projects will—
 - implement all measures needed to achieve the Port Standards, and

³ http://www.polb.com/environment/green_port_policy.asp

⁴ http://www.portoflosangeles.org/environment_air.htm

- prevent significant increases in NO_x, SO_x, PM, and health risk from diesel PM.

This control measure will be implemented through AQMD rules directed at the ports or operators of port facilities (e.g. marine terminals and railyards). These “backstop” rules will become effective if the ports or facilities do not take actions sufficient to achieve the port and project standards. More specific descriptions of the standards and backstop rules are set forth below:

1. Backstop of Port Standards for Nonattainment Pollutants

Summary: This rule will establish enforceable nonattainment pollutant emission reduction goals for the ports in order to implement the Air Quality Management Plan (AQMP). This “backstop” rule will come into effect if aggregate emissions from port sources exceed specified emissions targets. If emissions do not exceed such targets, the ports and source operators will have no control obligations under this rule.

Elements of Rule:

Emissions Targets: In developing the year 2007 revision to the AQMP, SCAQMD staff has identified emission reductions from port-related sources that are necessary to timely attain federal PM_{2.5} and 8-hour ozone standards. In doing so, staff has considered analyses of needed regional emissions reductions, control factors and schedules in CARB’s *Emission Reduction Plan for Ports and Goods Movement*, the draft *San Pedro Bay Ports Clean Air Action Plan*, and other information. Based on such information, staff has calculated mass emissions targets for NO_x, SO_x, and diesel PM for the ports. The emissions targets are for the years 2014 and 2020—the years in which attainment must be demonstrated for the PM_{2.5} and “8-hour” ozone National Ambient Air Quality Standards. As part of this rulemaking, staff will also calculate triennial mass emission milestones for years beginning in 2008 that are reasonable to achieve the emissions targets. In order to assure early progress, and consistent with goals stated in CARB’s *Emission Reduction Plan for Ports and Goods Movement*, the milestones for the year 2011 will be below emissions in the year 2001.

Scope of Emission Included. Emissions from all sources associated with each port, including equipment on port property, marine vessels traveling to and from the port while in California Coastal Waters, locomotives and trucks traveling to and from port-owned property while within the South Coast Air Basin.

Trigger Causing Backstop Rule Regulatory Requirements to Come Into Effect. Emissions exceeding a target or triennial milestone, as determined by the AQMD Executive Officer in consideration of annual port emission inventories and any other relevant data.

Requirements if Backstop Triggered. Two options for structuring this backstop rule will be considered during rulemaking. The first focuses obligations on operators of terminals and other facilities at the ports; the second focuses obligations on the ports themselves.

Option 1: Facility Plans. If this backstop rule is triggered for a port, emission reduction requirements will be established for each facility at the port that will, in aggregate, be sufficient to bring the port into compliance with the target or milestone within a timeframe specified in the rule. The emission reduction requirements will be

allocated among port facilities by the port (with AQMD approval), or the port may refer the issue to the AQMD Executive Officer to decide based on activity level and level of control at each facility. Each facility operator will then be required by the backstop rule to submit to the AQMD a plan including measures sufficient to timely achieve the required emission reductions. The operator may choose what measures to include and what sources to control, but the measures must provide assurance that the required emissions reductions will be achieved. Failure to implement the approved plan would be a violation of this rule by the facility operator.

Option 2: Port Plan. If this backstop rule is triggered for a port, that port shall submit an Emission Control Plan to the SCAQMD. The plan shall include measures sufficient to bring the port back into compliance with the emissions target or milestone within a timeframe specified in the rule. Failure to implement the plan would be a violation of this rule by the port.

2. Backstop of Port Standards for Health Risk from Diesel PM

Summary. This rule will establish enforceable requirements to control diesel particulate matter sufficiently to reduce health risks by at least 85% by 2020, and to further reduce emissions if necessary to achieve acceptable levels of health risk. This “backstop” rule will come into effect if a port does not adopt and implement a plan sufficient to reduce port risks, or if risks exceed milestones.

Elements of Rule

Risk Reduction Milestones. In developing this rule, the AQMD will establish triennial risk reduction milestones for the ports necessary to assure that, by the year 2020, health risks from diesel particulate matter will be reduced by 85% compared to risks in 2000. Risk reduction milestones will be stated in a form determined during rulemaking, and may be a percentage risk reduction, a risk level, an amount of diesel PM emission reduction, or other form. During rulemaking, the AQMD will also consider what, if any, additional emissions reductions will be necessary to achieve acceptable levels of health risk.

Trigger Causing Backstop Rule Regulatory Requirements to Come Into Effect. Failure of a port to implement a plan of measures that provide assurance of achieving the 85% standard, or emissions exceeding a triennial milestone as determined by the AQMD Executive Officer in consideration of periodic port emission inventories and any other relevant data.

Requirements if Backstop Triggered. This rule will be implemented in a fashion similar to one of the two options stated above under *Backstop of Port Standards for Nonattainment Pollutants*, except that emissions or risk control requirements would be established based on the risk reduction goals of this rule.

3. Backstop of Port Project Standards

Summary. This rule will establish requirements for approval of port projects in order to (1) prevent significant increases in NO_x, SO_x and PM, and health risk from diesel PM, and (2) ensure that port projects implement all control measures needed to achieve the Port Standards

described elsewhere in this measure. This “backstop” rule will come into effect if a port approves a project that does not assure that the project standards in this measure will be met.

Elements of Rule

Applicability. This rule will apply to projects on port land for which an Environmental Impact Report or Environmental Impact Statement is prepared (including terminal and railyard capacity expansions, lease approvals and lease modifications).

Project Standards. The following standards will be proposed for adoption:

1. Risk Limits. Incremental health risks caused by emissions from facilities affected by a project may not exceed pre-project risks by more than the following:

- Maximum Individual Cancer Risk: 10 in a million.
- Noncancer Acute and Chronic Hazard Index: 1.0

2. Nonattainment Pollutant Limits. Emissions from a port facility affected by a project may not exceed pre-project emissions by amounts that exceed AQMD CEQA significance thresholds unless—

- maximum available controls are employed by sources that operate at, or to and from, the facility, and
- feasible mitigations are provided for any emissions increases.

During rulemaking, the district will also consider whether or not to require that emissions increases be offset.

Contribution to Emissions and Risk Reductions. The project approval must contain terms providing reasonable assurance that projected emissions from the new or modified facility will, in conjunction with projected emissions from the rest of the port, allow the port to achieve the emissions targets and milestones established as Port Standards under this measure.

Trigger Causing Backstop Rule to Come Into Effect. Port approval of a project that does not comply with the standards in this rule, as determined by the AQMD Executive Officer.

Requirements if Backstop Triggered. If triggered, the backstop rule comes into effect for the project that triggered it. Such project may not commence construction unless the Executive Officer determines that the project will comply with the requirements of this rule.

RULE COMPLIANCE

Compliance with this control measure will depend on the type of control strategy implemented through each proposed rule. Compliance will be required through compliance plans, and enforced through inspections by District inspectors. .

TEST METHODS

The appropriate test methods will depend on the specific emission reduction projects undertaken and will be specified in each proposed rule. In general, SCAQMD, CARB and EPA test methods will be used, as well as manufacturer's data.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not yet been determined. The District will analyze the potential cost impact associated with implementing this control measure and will provide cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

The District has authority to adopt regulations to reduce or mitigate emissions from indirect sources, i.e. facilities such as ports that attract on and off-road mobile sources, and has certain authorities to control emissions from off-road mobile sources themselves. These authorities (which are further discussed in Addendum A of the Board Letter for Agenda Item 24, January 6, 2006 SCAQMD Board meeting) include the following:

Indirect Source Controls. State law provides the District authority to adopt rules to control emissions from "indirect sources." The Clean Air Act defines an indirect source as a "facility, building, structure, installation, real property, road or highway which attracts, or may attract, mobile sources of pollution." 42 U.S.C. § 7410(a)(5)(C); CAA § 110(a)(5)(C). Districts are authorized to adopt rules to "reduce or mitigate emissions from indirect sources" of pollution. (Health & Saf. Code § 40716(a)(1)). The South Coast District is also required to adopt indirect source rules for areas where there are "high-level, localized concentrations of pollutants or with respect to any new source that will have a significant impact on air quality in the South Coast Air Basin." (Health & Saf. Code § 40440(b)(3)).

Nonvehicular (Off-Road) Source Emissions Standards. Under California law "local and regional authorities," including the ports and the District, have primary responsibility for the control of air pollution from all sources other than motor vehicles. (Health & Saf. Code § 40000). Such "nonvehicular" sources include marine vessels, locomotives and other non-road equipment. CARB has concurrent authority under state law to regulate these sources. The federal Clean Air Act preempts states and local governments from adopting emission standards and other requirements for new locomotives (Clean Air Act § 209(e); 42 U.S.C. § 7543(e)), but California may establish and enforce standards for other nonroad sources upon receiving authorization from EPA (*Id.*). No such federal authorization is required for state or local fuel, operational, or mass emission limits for marine vessels, locomotives or other non-road equipment. (40 CFR Pt. 89, Subpt. A, App.A; *Engine Manufacturers Assn. v. Environmental Protection Agency*, 88 F.3d. 1075 (DC Cir. 1996)).

Fuel Sulfur Limits. With respect to nonroad engines, including marine vessels and locomotives, the District and CARB have concurrent authority to establish fuel limits, such as those on sulfur content. As was noted above, fuel regulations for nonroad equipment are not preempted by the Clean Air Act and do not require EPA authorization.

Operational Limits. The District has authority under state law to establish operational limits for nonvehicular sources such as marine vessels, locomotives, and cargo handling equipment (to the extent cargo handling equipment is “nonvehicular”). As was discussed above, operational limits for nonroad equipment are not preempted by Clean Air Act. In addition, the District may adopt operational limits for motor vehicles such as indirect source controls and transportation controls without receiving an authorization or waiver from EPA.

In implementing the above authorities, the District would need to consider limitations imposed by federal law, as discussed in Addendum A.

REFERENCES

SCAQMD, Clean Port Initiative Workplan, January 2006; Addendum A

CARB, Proposed 2003 State and Federal Strategy for the California State Implementation Plan, May 2003.

Port of Los Angeles, Port of Long Beach, Draft San Pedro Bay Ports Clean Air Action Plan, June 2005

CARB Emission Reduction Plan for Ports and Goods Movement, April 2006

No Net Increase Task Force, Report to Mayor Hahn and Councilwoman Hahn, June 2005.

CARB Diesel Particulate Matter Exposure Assessment Study of the Ports of Los Angeles and Long Beach, April 2006

EMISSION REDUCTIONS FROM THE CARL MOYER PROGRAM [NO_x AND PM]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	ON-ROAD AND OFF-ROAD DIESEL VEHICLES AND EQUIPMENT		
CONTROL METHODS:	CARL MOYER PROGRAM		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	2002	2014	2020
NO _x INVENTORY	494.7	314.0	215.2
NO _x REDUCTION		<u>10.1</u>	<u>13.4</u>
NO _x REMAINING		303.9	201.8
SUMMER PLANNING INVENTORY	2002	2014	2020
NO _x INVENTORY	496.8	315.1	215.4
NO _x REDUCTION		<u>10.1</u>	<u>13.4</u>
NO _x REMAINING		305.0	202.0
ANNUAL AVERAGE	2002	2014	2020
PM2.5 INVENTORY	22.8	11.6	6.6
PM2.5 REDUCTION		<u>0.3</u>	<u>0.4</u>
PM2.5 REMAINING		11.3	6.2
CONTROL COST:	\$14,300 PER TON		
IMPLEMENTING AGENCY:	AOMD		

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to continue the use of the Carl Moyer Memorial Air Quality Standards Attainment Program to reduce air pollution emissions by facilitating the move to cleaner-burning engines in both on-road and off-road vehicle fleets. The Carl Moyer Program encourages early introduction of clean air technology into the on-road and off-road vehicle fleets by providing funds to help purchase new vehicles or new engines (repowers) and for installation of retrofit units on older engines. This includes funding for technologies that reduce emissions of oxides of nitrogen (NO_x) and particulate matter (PM) caused by the combustion of diesel fuel in engines.

Background

In fiscal year 1998-99, the California State Legislature created the Carl Moyer Program, named in honor of a key figure in developing state air quality measures, to facilitate the move to cleaner-burning engines, which otherwise would have taken decades.

The program continues to drive early introduction of clean air technologies, and includes funding for measures that reduce NO_x, VOC, and PM caused by the combustion of diesel fuel and gasoline in on-road vehicles and off-road engines. The program also funds aftertreatment devices such as diesel oxidation catalyst and PM filters.

A variety of vehicle classes and types are funded under the Carl Moyer Program to help purchase new vehicles or new engines/repowers and for installation of retrofit units on older engines. New vehicles and engines must achieve a 30 percent reduction, and repowered vehicles and retrofits must achieve a 15% reduction of NO_x emissions compared to current emission standards. New engines should be CARB-certified and retrofits should be CARB-verified. Projects reducing PM and/or VOC are also eligible for funding provided they are cost-effective. Alternative fuel engines, such as those using compressed natural gas, liquefied natural gas, propane and electricity will be given preference for funding if less polluting. Cleaner diesel engines may also be considered in the off-road category.

Vehicles and equipment funded must remain in operation for at least three years, and 75 percent of their use must be within the South Coast Air Basin. All potential projects must meet cost-effectiveness requirements to be eligible for funding consideration.

The Carl Moyer Program under its new guidelines also includes “Fleet Modernization” and “Light-Duty Vehicle Repair and Scrapping” programs. The fleet modernization Program replaces pre-1990 heavy-duty diesel vehicles with 2006 and newer diesel or 2004 and newer natural gas vehicles. The Light-Duty Vehicle Repair and Scrapping Program identifies high polluting light-duty vehicles with remote sensing and offers repair or scrapping options.

Regulatory History

In addition to the legislature introducing the Carl Moyer Program, SB 1107 and AB 923 were passed with support from the business community, environmental groups, and public agencies which provide a long-term source of funding for the expansion of the Carl Moyer Program.

PROPOSED METHOD OF CONTROL

The proposed control measure is based on the implementation of the Carl Moyer Program by the District. The measure proposes to take credit for the emission reductions achieved through past and future projects funded under this program for SIP purposes, in two phases. Examples of projects include on-road heavy-duty vehicle modernization, installation of retrofit units, engine repowers, and remote sensing and repair or early retirement. Phase I of this control measure is based on the projects implemented from 1998 to 2006. Emission reductions from Phase I are estimated at 6.8 tons per day of NO_x and 0.2 ton per day of PM_{2.5} in 2014 and 2020 based on Carl Moyer Program’s emission quantification protocols. These reductions are reflected in the Draft 2007 AQMP as baseline inventory adjustments.

Phase II of this measure is based on future reductions to be achieved from the implementation of new projects under the Carl Moyer Program. These reductions were estimated based on the committed level of funding for this Program and a conservative cost-effectiveness assumption of

\$14,300 per ton specified in the Carl Moyer Program guidelines (although existing projects have substantially lower cost-effectiveness). The reductions are estimated to be 3.3 tons per day of NO_x and 0.1 ton per day of PM_{2.5} in 2014, and 6.6 tons per day of NO_x and 0.2 ton per day of PM_{2.5} in 2020. For the Draft 2007 AQMP, future reductions may overlap in some instances. However, actions will be taken to ensure no double counting occurs.

Every three to five years, emission reductions from projects funded under the Carl Moyer Program will be quantified, verified, and incorporated in the revised baseline emissions as part of SIP Revision process.

EMISSIONS REDUCTION

The emission reductions from Phases I and II of the control measure are reflected in the Control Measure Summary Table. In addition, the implementation of Light-Duty Vehicle Repair and Scrapping will start generating VOC emission reductions.

RULE COMPLIANCE AND TEST METHODS

The District has developed policies and procedures to ensure that this control measure is successfully implemented. In addition to the District's requirements for program implementation, the District adheres to CARB's Carl Moyer Guidelines. Because the Carl Moyer Program is implemented by a partnership of CARB and the District, CARB has oversight authority to ensure that funds are expended as required by the Health and Safety Code and to ensure that the Carl Moyer Program Guidelines are met. CARB is required to audit the District's program by reviewing the District's solicitation, evaluation, selection, contract, and invoicing process. CARB staff also visits a sample of funded projects to ensure that public funds are used to pay for qualifying projects that are operating and obtaining emission reductions.

COST EFFECTIVENESS

The cost effectiveness of this control measure is based on the Carl Moyer Program guidelines which establish an upper limit of \$14,300 per ton.

IMPLEMENTING AGENCY

The AQMD has authority to implement this control measure, and CARB has oversight authority.

GROUP 9

District's Long-Term Control Measures

REACTIVITY-BASED CONTROLS [VOC]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:		ARCHITECTURAL COATINGS, MISCELLANEOUS COATINGS AND SOLVENTS AND CONSUMER PRODUCTS	
CONTROL METHODS:		LOWERING REACTIVITY	
EMISSIONS (TONS/DAY):		SEE EMISSIONS REDUCTION SECTION	
SUMMER PLANNING INVENTORY	2002	2014	2020
VOC INVENTORY	207.7	170.8	175.1
VOC REDUCTION		---	<u>80.0</u>
VOC REMAINING		---	95.1
CONTROL COST:		NOT DETERMINED	
IMPLEMENTING AGENCY:		AQMD/CARB	

DESCRIPTION OF SOURCE CATEGORY

Background

Over the past two decades, regulations for coating and solvents have primarily focused on lowering the VOC content which has significantly reduced the VOC emissions from these categories. Reformulation of high-VOC compounds to low-VOC alternatives has resulted in substantial reductions in VOC emissions and improvement of ambient air quality. Despite these improvements, emissions from solvents and coatings continue to be significant and further reductions are needed in the future to meet the ambient air quality standards. Further reducing the VOC content of solvents and coatings may be very challenging. This is due to the limitations of resin chemistry, and the fact that it limits the formulation's flexibility in reformulating products. Because different chemicals used in coatings and solvents exhibit different reactivity rates in forming ozone in the atmosphere, a reactivity-based approach could produce equivalent air quality benefits to the mass-based approach. Therefore, because of the need to achieve additional VOC reductions for ozone attainment demonstration, reformulation based on lower reactive compounds need to be evaluated and considered in future rulemakings for coatings, solvents, and consumer products in order to provide a viable compliance option.

The VOC emissions are emitted from stationary sources and mobile sources and this long-term control measure addresses emissions from only stationary sources.

Regulatory History

Previous regulations have focused on reducing the VOC content within the solvents and coatings. However, VOC reactivity has been handled through the delisting of VOC compounds by the U.S. EPA and CARB. CARB's LEV programs considered reactivity in regulatory compliance options.

PROPOSED METHOD OF CONTROL

Under this control measure, the District is proposing to reduce the VOC ozone forming potential by reducing the overall reactivity from VOC containing materials. The focus of VOC source categories would be architectural coatings, miscellaneous coatings and solvents and consumer products. The proposed measure would require all applicable coatings or paints to be formulated with a 50 percent minimum by volume acetone reactivity-equivalent materials beginning in 2015. Alternative compliance options such as mass-based controls or product averaging would also be explored.

EMISSIONS REDUCTION

The air quality benefits of this long-term measure are considered as part of the modeling analysis. Equivalent VOC mass emission reductions have been determined to be approximately 80 tons per day by 2020 of which 56 tons per day of reductions are associated with consumer products under CARB's jurisdiction and the remaining 24 tons per day reductions are from coatings and solvent categories under the District's jurisdiction.

RULE COMPLIANCE AND TEST METHODS

Further study would also be required to evaluate the reactivity of different compounds under various meteorological conditions used to develop a systematic approach for regulatory programs.

COST EFFECTIVENESS

The cost-effectiveness of this control measure has not been determined.

IMPLEMENTING AGENCY

CARB and the District have the authority to regulate emissions from source categories subject to this measure.

FURTHER EMISSION REDUCTIONS FROM NO_x RECLAIM FACILITIES [NO_x]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:		NO _x RECLAIM FACILITIES	
CONTROL METHODS:		ALL AVAILABLE CONTROL METHODS	
EMISSIONS:			
ANNUAL AVERAGE	2002	2014	2020
NO _x INVENTORY	TBD	TBD	TBD
NO _x REDUCTION		TBD	TBD
NO _x REMAINING		TBD	TBD
SUMMER PLANNING INVENTORY	2002	2014	2020
NO _x INVENTORY	TBD	TBD	TBD
NO _x REDUCTION		TBD	TBD
NO _x REMAINING		TBD	TBD
CONTROL COST:		TO BE DETERMINED	
IMPLEMENTING AGENCY:		AQMD	

DESCRIPTION OF SOURCE CATEGORY

Background

Under the RECLAIM program, facilities are issued NO_x and/or SO_x allocations. Allocations decline annually until 2003, and remain constant thereafter. To meet their annual allocation, facilities have the option of installing pollution control equipment, changing operations, or purchasing RECLAIM Trading Credits (RTCs).

Additional emission reductions from RECLAIM may be needed to meet the federal “as expeditiously as practicable” and the state “all feasible measures” requirements. When the RECLAIM program was adopted, it was designed to achieve a Best Available Retrofit Control Technology (BARCT) level of emission reductions. As BARCT is updated to reflect improvements in pollution control equipment, additional reductions from the RECLAIM program may be possible.

This BARCT assessment is made in conjunction with the approximate 3-year cycle of the AQMP. Any applicable BARCT identified during the AQMP would then be subject to the rulemaking process.

Regulatory History

On October 15, 1993, the AQMD's Governing Board adopted the RECLAIM program. Regulation XX – RECLAIM includes 11 rules that specify the applicability, allocations, definitions, requirements, and monitoring, reporting, and recordkeeping requirements. When the RECLAIM program was adopted, it originally included 392 NO_x and 41 SO_x commercial and industrial facilities. Since the adoption of RECLAIM, there have been a number of amendments to the RECLAIM rules.

During late 2000, the combination of the energy crisis and delayed installation of pollution control equipment resulted in high RTC prices. A series of mechanisms are now in place to stabilize RTC prices. As part of the rule amendment proceeding and program evaluation, both U.S. EPA and ARB have requested the District to revisit the ending allocation for the RECLAIM NO_x program.

In January 2005, the Board adopted further reductions to RECLAIM Allocations starting Compliance Year 2007 to implement BARCT. Reductions would proceed until the 2011 compliance year. The total NO_x reduction from the RECLAIM facilities was determined to be 7.7 tons per day. As such, RECLAIM is designed to achieve the same level of emissions reductions as would have been achieved in aggregate by implementing the subsumed rules and command-and-control measures as well as complying with state law, such as California Health and Safety Code §39616(e). The BARCT associated with the January 2005 amendment was identified in Control Measure CMB-10 in the 2003 AQMP.

PROPOSED METHOD OF CONTROL

The proposed measure will be implemented in two phases:

- Phase I: Beginning in 2008 the RECLAIM allocations will be reduced to offset the potential emission increases due to the introduction of natural gas with a Wobbe Index greater than 1360. As described in CMB-04, natural gas with higher heating value would potentially increase NO_x emissions from natural gas combustion equipment. Since RECLAIM represents about 70% of AQMD permitted stationary source NO_x emissions, the proposed measure would require the RECLAIM program through its market mechanism to offset the emissions.
- Phase II: It is anticipated that BARCT technology would evolve in the next 10 to 15 years. In addition, facilities in the RECLAIM program are required to install BACT if RECLAIM NSR is triggered. This phase of the control is to further reduce the RECLAIM allocations to reflect future BARCT and any BACT installations due to RECLAIM NSR requirements.

In addition, during rule development for MCS-01 its applicability to RECLAIM program will also be examined to ensure equity between RECLAIM and non-RECLAIM sources.

EMISSION REDUCTION

The phase I of emission reductions are estimated to be at least 2.5 tons per day of NO_x. Based on historical advancements in control technology and RECLAIM's fair share in the 2021 ozone attainment demonstration, it is anticipated that the Phase II reductions would range from 3 to 5 tons per day.

RULE COMPLIANCE AND TEST METHOD

Compliance with the provisions of this control measure would be based on monitoring, recordkeeping and reporting requirements that have been established in either the RECLAIM program or existing source specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not yet been determined.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from stationary sources.

REFERENCE

Health and Safety (H&S) Code: § § 40913, 40914, 40920.5, § 40406 and § 40440 (b)(1)

14 California Code of Regulations, section 15364

See Control Measure 2007CMB-04 for further references.

LONG-TERM CONTROL MEASURE FOR FUGITIVE EMISSIONS [VOC]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	GASOLINE DISPENSING FACILITIES, PETROLEUM REFINERIES, CHEMICAL PLANTS, AND GREEN WASTE COMPOSTING		
CONTROL METHODS:	PHASE I: TECHNOLOGY ASSESSMENT AND EMISSIONS CHARACTERIZATION		
	PHASE II: DEVELOPMENT AND IMPLEMENTATION OF CONTROL STRATEGIES		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	2002	2014	2020
VOC INVENTORY	34.5	31.9	33.5
VOC REDUCTION		0.0	10.1
VOC REMAINING		31.9	23.5
SUMMER PLANNING INVENTORY	2002	2014	2020
VOC INVENTORY	34.5	32.0	33.5
VOC REDUCTION		0.0	10.1
VOC REMAINING		32.0	23.5
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	SCAQMD		

DESCRIPTION OF SOURCE CATEGORY

Background

The emission sources targeted under this control measure include a variety of fugitive emissions from gasoline dispensing facilities, petroleum refineries, chemical plants, and green waste composting. Emissions from these fugitive emission source categories have been reduced over time and will be further reduced through the short- and intermediate-term measures as proposed. However, in aggregate, fugitive VOC emissions will still represent a significant emission source. Therefore, it is necessary to further consider reducing emissions from this source category.

The objective of this control measure is to further develop data and methodology to better define and refine emissions from each specific source category. In addition, new technologies, methods, and work practices need to be identified and evaluated that could locate, eliminate, and/or reduce fugitive emissions more effectively and efficiently. These developments will provide opportunities for further reductions in fugitive emissions.

Regulatory History

Gasoline Dispensing Facilities - New and existing gasoline dispensing facilities are regulated under District Rule 461, "Gasoline Transfer and Dispensing." Among other requirements, vapor recovery components need to be CARB-certified. New, relocated, and modified facilities are subject to Regulation XIII, "New Source Review," and Rule 1401, "New Source Review of Toxic Air Contaminants".

Petroleum Refineries - Rules applicable to this industry may include, but are not limited to: Regulations IV, IX, X, XIII, XIV, and XX and Rules 1105, 1173, and 1178.

Chemical Plants - Regulations IV, IX, X, XIII, XIV, and XX, as well as Rules 1141, 1141.2, 1159, 1163, and 1189 may be applicable to these sources.

Green Waste Composting – Rules applicable to this category may include, but are not limited to: Regulations IV, IX, X, XIII, XIV, XX and Rules 1133, 1133.1 and 1133.2.

PROPOSED METHOD OF CONTROL

This control measure will be implemented in two phases. In the first phase, emissions data and characteristics for each source category will be developed and refined. Technology assessments will be conducted to identify and evaluate any control technology, method or work practices that may be applied to each affected source category. Alternative leak detection methods, for example, are being developed that have the potential to be more efficient in detecting fugitive leaks from pipeline components, process equipment, and oil/gas production facilities. Low emitting packing and seals, leakless devices, and durable and reliable vapor recovery systems may be applicable more widely to petroleum products processing, distribution and gasoline dispensing facilities. New storage tank accessories or better roof seals are other examples that may become available to further reduce fugitive emissions. Depending on the result of the assessment, specific control strategies will be developed for implementation in the second phase. Good management practices to reduce fugitive emissions will also be evaluated and incorporated into operating procedures.

EMISSIONS REDUCTION

An estimated 10.1 tons per day of VOC will be reduced by the year 2020.

RULE COMPLIANCE AND TEST METHODS

Compliance and testing for this control measure would be based on monitoring, recordkeeping, and reporting requirements that have been established in either the RECLAIM program or existing source-specific rules and regulations. Compliance would also be verified through inspections and other recordkeeping and reporting requirements. Additional test methods may need to be developed once specific control methods are defined.

COST EFFECTIVENESS

Cost-effectiveness has not yet been determined for this control measure.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from the targeted sources.

CONCURRENT REDUCTIONS FROM GLOBAL WARMING STRATEGIES [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:		STATIONARY AND MOBILE SOURCES OF FUEL COMBUSTION	
CONTROL METHODS:		CONCURRENT REDUCTIONS FROM GLOBAL WARMING STRATEGIES	
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	2002	2014	2020
NOX INVENTORY	1066.5	642.6	266.0
NOX REDUCTION		---	<u>40.0</u>
NOX REMAINING		---	226.0
SUMMER PLANNING INVENTORY	2002	2014	2020
VOC INVENTORY	717.1	386.9	179.3
VOC REDUCTION		---	<u>27.0</u>
VOC REMAINING		---	152.3
CONTROL COST:		TO BE DETERMINED	
IMPLEMENTING AGENCY:		CARB, CEC, PUC, AQMD	

DESCRIPTION OF SOURCE CATEGORY

This control measure seeks to achieve concurrent reductions from all fuel combustion source global warming strategies related to fuel efficiency improvements and renewable energy sources.

Background

There is broad scientific consensus that the increased concentrations of greenhouse gases (GHGs) in the atmosphere will lead to global climate change in this century. The industrial revolution and the increased consumption of fossil fuels (e.g., gasoline, diesel, wood, coal, etc.) have contributed to substantial increase in atmospheric levels of greenhouse gases primarily carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons. These gases trap the sun's heat in the atmosphere, like a blanket, causing the atmospheric temperatures to rise. Over time, the increased temperature could result in climate change effects such as raising sea levels, altering precipitation patterns, and changing water supplies and crop yields. Global warming could also adversely affect human health, harm wildlife, and damage fragile ecosystems. Higher atmospheric temperatures would also result in more emissions, increased smog levels, and the associated health impacts.

Regulatory History

In June 2005, Governor Schwarzenegger signed Executive Order #S-3-05 which established the following greenhouse gas targets:

By 2010, Reduce to 2000 Emission Levels

By 2020, Reduce to 1990 Emission Levels

By 2050, Reduce to 80% Below 1990 Levels

The emission levels in California were estimated to be 426 million metric tons CO₂ equivalent for 1990, 473 million metric tons CO₂ equivalent for 2000, 532 million metric tons CO₂ equivalent for 2010, and 600 million metric tons CO₂ equivalent for 2020. The Governor's goals for emission reductions were estimated to be approximately 59 and 174 million tons CO₂ equivalent by 2010 and 2020, respectively.

The Executive Order created the Climate Action Team, with the California Environmental Protection (Cal/EPA) as the lead responsible for coordinating efforts from multiple agencies including California Air Resources Board (CARB), California Energy Commission (CEC), Resources Agency and Public Utilities Commission (CPUC), California Integrated Waste Management Board (CIWMB), Business, Transportation, & Housing (BT&H), and Department of Food and Agriculture (CDFA). The mission of the Climate Action Team was to develop and implement emission reduction strategies to achieve the Governor's greenhouse gas targets; and to submit a progress report to the Governor and the legislature on a biannual basis, starting in 2006.

The Climate Action Team's report, published in March 2006, recommends 46 specific emission reduction control strategies for greenhouse gas. Many of the strategies also reduce ozone, criteria and toxic pollutants. Table 1 provides a summary of 11 control measures that were adopted by various state agencies and are underway. These measures were estimated to provide approximately 22 million tons CO₂ equivalent in emission reductions in 2010, and 68 million tons CO₂ equivalent in emission reductions in 2020, which were about half way towards meeting the Governor's goals.

As shown in Table 1, the motor vehicle standards would provide the largest emission reductions about 30 millions tons CO₂ equivalent reductions in 2020. Two other key strategies in the state are the Energy Efficiency Programs and the Renewable Portfolio Standard which contributed about 16 and 11 millions tons CO₂ equivalent reductions in 2020. The 11 control strategies already adopted only provide less than half of the emission reductions needed for California, which are 22 millions ton and 68 million tons reduction in 2010 and 2020 respectively. Table 2 contains a list of additional control measures recommended by the Climate Action Team that need to be adopted in the next two years to achieve the Governor's emission reduction goals.

A brief explanation of the 11 control measures already adopted and underway is presented below.

TABLE 1
Emission Reduction Strategies Underway in California^a

Agency	Strategies	Emission Reductions (Million Tons CO ₂)	
		2010	2020
CARB	Vehicle Climate Change Standards	1	30
	Diesel Anti-idling	1	1.2
CPUC	Accelerated Renewable Portfolio Std to 33% by 2020 (including load-serving entities [LSE])	5	11
	California Solar Initiative (Million Solar Roofs)	0.4	3
	Investor Owned Utility Energy Efficiency Programs	4	8.8
	Achieving 50% Statewide Recycling Goal	3	3
CIWMB CEC	Building Energy Efficiency Standards	1	2
	Appliance Energy Efficiency Standards	3	5
	Fuel-efficient Replacement Tires & Inflation Programs	1.5	1.5
	Green Buildings Initiative	0.5	1.8
CARB	Hydrogen Highway	Included ^b	
Total Potential Emission Reductions		22	68

a) Climate Action Team 2006 Report to Governor Schwarzenegger and the Legislature

b) The emission benefits of Hydrogen Highway have been captured in other programs such as the motor vehicle regulations and the green building initiative.

Motor Vehicle Standards (CARB)

Regulations were adopted by the CARB in September 2004 in response to the requirements in Assembly Bill 1493, Pavley, Chapter 200, Statutes of 2002. The regulations apply to new passenger vehicles and light duty trucks beginning with 2009 model year through 2016 model year. The ARB analysis indicated that these regulations would result in 30 millions tons CO₂ equivalent emission reductions by 2020.

Diesel Anti-Idling (CARB)

In July 2004, the ARB adopted a measure to limit diesel-fueled commercial motor vehicle idling which will reduce climate change emissions by 1.2 millions tons CO₂ equivalent by 2020.

Renewable Portfolio Standard (CPUC and CEC)

The Renewable Portfolio Standard (RPS), established in 2002, requires that all load serving entities achieve a goal of 20 percent of retail electricity sales from renewable energy sources by 2017. The Governor has increased this goal to 33 percent

renewable which was adopted by CPUC and CEC in 2005 as described in the *2005 Energy Action Plan II*. The two agencies have already commenced review of the legal, regulatory, and infrastructure changes necessary to achieve the Governor's goal. It was estimated that this measure would result in 11 millions tons CO₂ equivalent emission reductions by 2020.

California Solar Initiative (CPUC)

The Governor has initiated a goal of installation 1 million solar roofs or an equivalent 3,000 MW by 2017 on new and existing residential, commercial and industrial properties, increase the use of solar thermal systems to offset the increasing demand for natural gas, use of advanced metering in solar applications, and creation of a funding source that can provide rebates over 10 years through a declining incentive schedule. In August 2006, the CPUC further outlined a detailed plan to implement this \$2.9 billion California Solar Initiative over a 10-year period. This plan will be administered through Pacific Gas and Electric Company, Southern California Edison, Southern California Gas Company and the San Diego Regional Energy Office. It was estimated that this measure would result in 3 millions tons CO₂ equivalent emission reductions by 2020.

Investor-Owned Utility Energy Efficiency Program (CPUC)

In September 2004, the CPUC adopted emission reduction targets for the investor-owned utility energy efficiency programs through 2013 and set savings targets for both electricity and natural gas. It was estimated that this measure would result in 8.8 millions tons CO₂ equivalent emission reductions by 2020.

Achieving 50% Statewide Recycling Program (CIWMB)

Achieving the State's 50 percent recycling goal was established by the Integrated Waste Management Act of 1989, AB 939, Sher, Chapter 1095, Statutes of 1989. Currently a diversion rate of 48 percent has been achieved on a statewide basis. This measure reduces the greenhouse gas emissions associated with energy used for material extraction and production as well as methane gas emissions from landfills. The CIWMB estimated a reduction of approximately 3 millions tons CO₂ equivalent in 2020.

Building Energy Efficiency Standards (CEC)

Public Resources Code 25402 authorizes the CEC to adopt and periodically update (i.e. every three years) its building energy efficiency standards which apply to newly constructed buildings, and additions to or alterations to existing buildings. Recent policies have placed priority on and established specific goals for updating of the standards promoting the combination of solar photovoltaic and high-efficiency buildings and addressing demand response. The CEC estimated a reduction of approximately 2 millions tons CO₂ equivalent in 2020.

Appliance Energy Efficiency Standards (CEC)

Public Resources Code 25402 authorizes the CEC to adopt and periodically update its appliance energy efficiency standards that apply to devices and equipment using energy that are sold or offered for sale in California. New standards for a variety of appliances were adopted in December 2004. Some standards under consideration in December 2004 were delayed to further consider manufacturer comments. The CEC estimated this program would provide a savings of approximately 5 millions tons CO₂ equivalent in 2020.

Fuel-Efficient Replacement Tires and Inflation Programs (CEC)

State legislation, Chapter 912, Statutes of 2001, encourages the production and use of fuel-efficient tires and directed the CEC to investigate, recommend, and implement measures to improve fuel-efficiency of vehicle tires and to set mandatory fuel efficiency standard for all after-market tires sold in California. The CEC estimated this program would provide a savings of approximately 1.5 millions tons CO₂ equivalent in 2020

Green Buildings Initiative (BT&H)

Governor Schwarzenegger's Green Building Executive Order, S-20-04, calls for a reducing of energy use in public and private buildings by 20 percent by the year 2015, as compared with 2003 levels. The Executive Order requires state agencies to take specific actions with state-owned and -leased buildings, and contains various strategies and incentives to encourage private building owners and operators in order to achieve the 20 percent target. Preliminary estimates for this control measure are approximately 1.5 millions tons CO₂ equivalent emission reductions in 2020.

Hydrogen Highway (CARB)

The California Hydrogen Highway Network (CA H2 Net) is a state initiative to promote the use of hydrogen as a means of diversifying the sources of transportation energy. The CA H2 Net requires the utilizing of at least 20 percent renewable resources in the production of hydrogen to reduce climate change emissions as well as criteria and toxic pollutants. The emission reductions of this program are captured in other programs such as the motor vehicle regulations.

TABLE 2
Emission Reduction Strategies for Adoption in Next 2-Years

Agency	Strategies	Emission Reduction (Million Tons CO ₂)	
		2010	2020
CARB	Other New Light Duty Vehicle Technology Improvements	0	4
	HFC Reduction Strategies	2.7	8.5
	Transport Refrigeration Units, Off-road Electrification, Port Electrification (ship to shore)	<1	<1
	Manure Management	1	1
	Semi Conductor Industry Targets	2	2
	Alternative Fuels: Biodiesel Blends	<1	<1
	Alternative Fuels: Ethanol	<1	3.2
	Heavy-Duty Vehicle Emission Reduction Measures	0	3
	Reduced Venting and Leaks in Oil and Gas Systems	1	1
	Cement Manufacturing	<1	<1
CEC	Municipal Utility Energy Efficiency Programs/ Demand Response	1	5.9
	Municipal Utility Renewable Portfolio Standard	<1	3.2
	Municipal Utility Combined Heat and Power	0	<1
	Municipal Utility Electricity Sector Carbon Policy	3	9
	Alternative Fuels: Non-Petroleum Fuels	TBD	TBD
CPUC	Investor-Owned Utility (IOU) Additional Energy Efficiency Programs and Demand Response	NA	6.3
	IOU Combined Heat and Power Initiative	1.1	4.4
	IOU Electricity Sector Carbon Policy	1.6	2.7
CIWMB	Landfill Methane Capture	2	3
	Zero Waste—High Recycling		3
Water Depart	Water Use Efficiency	0.4	1.2
Forestry Depart.	Forest Management	1-2	2-4
	Forest Conservation	4.2	8.4
	Fuels Management/Biomass	3.4	6.8
	Urban Forestry	0	3.5
	Afforestation/Reforestation	0	12.5
BT&H	Measures to Improve Transportation Energy Efficiency	1.8	9
	Smart Land Use and Intelligent Transportation	5.5	18
	Conservation tillage/cover crops	TBD	TBD
	Enteric Fermentation	<1	<1
	Transportation Policy Implementation	TBD	TBD
Total Potential Emission Reductions		39	197

AB32 codifies the State goal by requiring the State GHG emissions be reduced to 1990 levels by 2020 through an enforceable statewide cap on GHG emissions which will be phased in starting on 2012. AB32 also directs CARB to develop appropriate regulations and establish a mandatory reporting system for tracking and monitoring GHG. The bill specifically requires the CARB to:

- By January 2008, adopt regulations to mandatory require reporting and verification of statewide greenhouse gas emissions, and to monitor and enforce compliance with this program, starting with the sources or categories of sources that contribute the most to statewide emissions (e.g. electric generation, coal, oil and gas plants);
- By January 2008, determine what the statewide greenhouse gas emissions level was in 1990 which must be achieved by 2020 as directed by the Governor in 2005;
- On or before June 2007, publish and make available to the public a list of discrete early action greenhouse gas emission reduction measures that can be implemented prior to January 2011; and on or before January 2010, adopt regulations to implement these measures to achieve maximum technologically feasible and cost effective emission reductions;
- On or before January 2011, adopt greenhouse gas emission limits and additional measures, above and beyond the measures identified in 2007, which may include market-based compliance mechanisms, to achieve the statewide greenhouse gas emission limits and statewide reductions.

PROPOSED METHOD OF CONTROL

Achieving reduction targets specified in AB32 would require significant development and implementation of energy efficiency technologies and extensive shifting of energy production to renewable sources, as outlined in Tables 1 and 2 above. In addition to reducing GHG emissions, such strategies would concurrently reduce emissions of criteria pollutants associated with fossil fuel combustion.

This measure proposes to quantify the concurrent emission reductions associated with Statewide GHG programs targeted at stationary and mobile sources in the Basin working with various state agencies. Emission reductions from these programs will be applied toward the long-term reduction targets proposed in the Draft 2007 AQMP for meeting the federal ozone standard by 2021 (or 2024).

The District will continue to collaborate with various State agencies in quantifying the concurrent combustion emission reductions.

EMISSIONS REDUCTION

For the purpose of this draft plan, a 15 percent reduction in criteria pollutant emissions from all fuel combustion source categories is assumed. In the next several months, the reduction assumption would be refined based on further consultation with CARB and stakeholder input.

REFERENCES

1. Assembly Bill 32, Nunez, California Global Warming Solutions Act of 2006.
2. California Public Utilities Work Plan, January 2006
3. California Solar Initiative, FACT Sheet, August 24, 2006
4. Climate Action Team Final Report to the Governor and Legislature, March 2006
5. Energy Action Plan II, California Energy Commission and Public Utilities Commission, September 2005
6. Executive Order S-3-05 by the Governor of the State of California
7. State Agency Work Plan, February 2006
8. State Chronological Actions to Address Global Climate Change, March 2006

FURTHER VOC REDUCTIONS FROM MOBILE SOURCES [VOC]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:		ON-ROAD AND OFF-ROAD MOBILE SOURCE CATEGORIES	
CONTROL METHODS:		ACCELERATED FLEET TURN-OVER, RETROFITS	
EMISSIONS (TONS/DAY):		TBD	
ANNUAL AVERAGE	2002	2014	2020
VOC INVENTORY	669.7	336.9	279.8
VOC REDUCTION		<u>0.0</u>	<u>20.0</u>
VOC REMAINING		336.9	259.8
SUMMER PLANNING INVENTORY	2002	2014	2020
VOC INVENTORY	707.7	378.1	318.4
VOC REDUCTION		<u>0.0</u>	<u>20.0</u>
VOC REMAINING		378.1	298.4
CONTROL COST:		TO BE DETERMINED	
IMPLEMENTING AGENCY:		CARB	

DESCRIPTION OF SOURCE CATEGORY

Background

The emission sources targeted under this control measure include on-road mobile source such as passenger cars, light-, medium, and heavy-duty vehicles and motorcycles and off-road mobile sources such as aircraft, trains, marine vessels, pleasure craft, recreational vehicles, and construction and industrial equipment.

The objective of this long-term control measure is to achieve further VOC reductions from mobile sources in order to attain the federal 8-hour ozone standard by 2020.

Regulatory History

CARB and U.S. EPA have adopted a number of regulations affecting on-road and off-road mobile sources. For the most part, these regulations have established new engine standards or fuel requirements for various source categories. However, additional regulations need to be developed for accelerated turn-over and retrofit of existing vehicles and equipment in order to accelerate the emission benefits associated with new engine and fuel standards.

PROPOSED METHOD OF CONTROL

This control measure proposes to achieve further VOC reductions from various mobile source categories beyond the reductions achieved from the short-term measures through 1) accelerated turn-over existing equipment and vehicles and replacement with new equipment meeting the new engine standards; and 2) retrofit of existing vehicles and equipment with add-on controls such as oxidation

catalysts and evaporative emission controls. Potential categories include passenger cars and light-, medium and heavy-duty vehicles as well as pleasure craft and recreational vehicles.

EMISSIONS REDUCTION

The emission reduction target for this measure is 20 tons of VOC by 2020.

RULE COMPLIANCE AND TEST METHODS

Compliance for this control measure would be based on CARB's adopted regulation(s) affecting existing on-road and off-road mobile sources.

COST EFFECTIVENESS

Cost-effectiveness has not yet been determined for this control measure.

IMPLEMENTING AGENCY

CARB has the authority to regulate emissions from the targeted sources.